

SEQUENCE LISTING



<110> EDWARDS, ALED
DHARAMSI, AKIL
VEDADI, MASOUD
ALAM, MUHAMMAD ZAHOR
DOMAGALA, MEGAN
HOUSTON, SIMON
LAM, ROBERT
LI, QIN
NETHERY, KATHLEEN
NG, IVY
PINDER, BENJAMIN
VIOLA, CRISTINA
WREZEL, OLGA
KANAGARAJAH, DHUSHY
MANSOURY, KAMRAN
NECAKOV, ALEKSANDAR SASHA
VALLEE, FRANCOIS
MCDONALD, MERRY-LYNN

<120> NOVEL PURIFIED POLYPEPTIDES FROM BACTERIA

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peptide

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 1 5 10 15

Arg Gly Ser His
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<210> 2
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 peptide

<400> 2
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 1 5 10 15

<210> 3
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<400> 3
 Gly Ser Glu Asn Leu Tyr Phe Gln
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<210> 4
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 <213> Staphylococcus aureus

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 actgtcaatg atggaaaaga cttatcacaa gatgctcatg caaaagattt agaatctatg 180
 ggcatttctg ttgtaagtgg aagtcaccca ttaacgttgc ttgataataa tccaataatt 240
 gttaaaaatc ctggaatacc ttatacagta tctattattg atgaagcagt gaaacgaggt 300
 ttgaaaattt taacagaagt tgagttaagt tatctaattc ctgaagcacc aatcatagct 360
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 agtcgcttaa ctggaagatt atccggcaat attgggtatg ttgcatctaa agtagcacia 480
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 gaaaagtata aaccacacat tgctataatt actaacattt attcggcgca tctagattac 600
 catgaaaatt tagaaaacta tcaaaatgct aaaaagcaaa tatataaaaa tcaaacggaa 660
 gaggattatt tgatttgtaa ttatcatcaa agacaagtga tagagtcgga agaattaaaa 720
 gctaagacat tgtatttctc aactcaacaa gaagttagtg gtattttatat taaagatggg 780
 tttatcgttt ataaaggtgt tcgtattatt aacactgaag atctagtatt gcctgggtgaa 840
 cataatttag aaaatatatt agcagctgtg cttgcttgta ttttagctgg tgtacctatt 900
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<211> 454

<212> PRT

<213> Staphylococcus aureus

<400> 5

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      20              25              30

Leu Ser Lys Leu Gly Ala Asn Val Thr Val Asn Asp Gly Lys Asp Leu
      35              40              45

Ser Gln Asp Ala His Ala Lys Asp Leu Glu Ser Met Gly Ile Ser Val
      50              55              60

Val Ser Gly Ser His Pro Leu Thr Leu Leu Asp Asn Asn Pro Ile Ile
      65              70              75              80

Val Lys Asn Pro Gly Ile Pro Tyr Thr Val Ser Ile Ile Asp Glu Ala
      85              90              95

Val Lys Arg Gly Leu Lys Ile Leu Thr Glu Val Glu Leu Ser Tyr Leu
      100             105             110

Ile Ser Glu Ala Pro Ile Ile Ala Val Thr Gly Thr Asn Gly Lys Thr
      115             120             125

Thr Val Thr Ser Leu Ile Gly Asp Met Phe Lys Lys Ser Arg Leu Thr
      130             135             140

Gly Arg Leu Ser Gly Asn Ile Gly Tyr Val Ala Ser Lys Val Ala Gln
      145             150             155             160

Glu Val Lys Pro Thr Asp Tyr Leu Val Thr Glu Leu Ser Ser Phe Gln
      165             170             175

Leu Leu Gly Ile Glu Lys Tyr Lys Pro His Ile Ala Ile Ile Thr Asn
      180             185             190

Ile Tyr Ser Ala His Leu Asp Tyr His Glu Asn Leu Glu Asn Tyr Gln
      195             200             205

Asn Ala Lys Lys Gln Ile Tyr Lys Asn Gln Thr Glu Glu Asp Tyr Leu
      210             215             220

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Ile Cys Asn Tyr His Gln Arg Gln Val Ile Glu Ser Glu Glu Leu Lys
 225 230 235 240
 Ala Lys Thr Leu Tyr Phe Ser Thr Gln Gln Glu Val Asp Gly Ile Tyr
 245 250 255
 Ile Lys Asp Gly Phe Ile Val Tyr Lys Gly Val Arg Ile Ile Asn Thr
 260 265 270
 Glu Asp Leu Val Leu Pro Gly Glu His Asn Leu Glu Asn Ile Leu Ala
 275 280 285
 Ala Val Leu Ala Cys Ile Leu Ala Gly Val Pro Ile Lys Ala Ile Ile
 290 295 300
 Asp Ser Leu Thr Thr Phe Ser Gly Ile Glu His Arg Leu Gln Tyr Val
 305 310 315 320
 Gly Thr Asn Arg Thr Asn Lys Tyr Tyr Asn Asp Ser Lys Ala Thr Asn
 325 330 335
 Thr Leu Ala Thr Gln Phe Ala Leu Asn Ser Phe Asn Gln Pro Ile Ile
 340 345 350
 Trp Leu Cys Gly Gly Leu Asp Arg Gly Asn Glu Phe Asp Glu Leu Ile
 355 360 365
 Pro Tyr Met Glu Asn Val Arg Ala Met Val Val Phe Gly Gln Thr Lys
 370 375 380
 Ala Lys Phe Ala Lys Leu Gly Asn Ser Gln Gly Lys Ser Val Ile Glu
 385 390 395 400
 Ala Asn Asn Val Glu Asp Ala Val Asp Lys Val Gln Asp Ile Ile Glu
 405 410 415
 Pro Asn Asp Val Val Leu Leu Ser Pro Ala Cys Ala Ser Trp Asp Gln
 420 425 430
 Tyr Ser Thr Phe Glu Glu Arg Gly Glu Lys Phe Ile Glu Arg Phe Arg
 435 440 445
 Ala His Leu Pro Ser Tyr
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<211> 1365

<212> DNA

<213> Staphylococcus aureus

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 ggcatttctg ttgtaagtgg aagtcaccca ttaacgttgc ttgataataa tccaataatt 240
 gttaaaaatc ctggaatacc ttatacagta tctattattg atgaagcagt gaaacgaggt 300
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gaagtaaaagc ctacagatta tttagttaca gagttgtcgt cattccagtt acttggaatc 540
gaaaagtata aaccacacat tgctataatt actaacattt attcggcgca tctagattac 600
catgaaaatt tagaaaacta tcaaaatgct aaaaagcaaa tatataaaaa tcaaacggaa 660
gaggattatt tgattttgtaa ttatcatcaa agacaagtga tagagtcgga agaattaaaa 720
gctaagacat tgtattttctc aactcaacaa gaagttgatg gtattttatat taaagatggg 780
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<210> 7

<211> 454

<212> PRT

<213> *Staphylococcus aureus*

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Ile Leu Val Val Gly Leu Ala Lys Ser Gly Tyr Glu Ala Ala Lys Leu
      20                      25          30

Leu Ser Lys Leu Gly Ala Asn Val Thr Val Asn Asp Gly Lys Asp Leu
      35                      40          45

Ser Gln Asp Ala His Ala Lys Asp Leu Glu Ser Met Gly Ile Ser Val
      50                      55          60

Val Ser Gly Ser His Pro Leu Thr Leu Leu Asp Asn Asn Pro Ile Ile
      65                      70          75          80

Val Lys Asn Pro Gly Ile Pro Tyr Thr Val Ser Ile Ile Asp Glu Ala
      85                      90          95

Val Lys Arg Gly Leu Lys Ile Leu Thr Glu Val Glu Leu Ser Tyr Leu
      100                     105          110

Ile Ser Glu Ala Pro Ile Ile Ala Val Thr Gly Thr Asn Gly Lys Thr
      115                     120          125

Thr Val Thr Ser Leu Ile Gly Asp Met Phe Lys Lys Ser Arg Leu Thr
      130                     135          140

Gly Arg Leu Ser Gly Asn Ile Gly Tyr Val Ala Ser Lys Val Ala Gln
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Glu Val Lys Pro Thr Asp Tyr Leu Val Thr Glu Leu Ser Ser Phe Gln
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 180 185 190
 Ile Tyr Ser Ala His Leu Asp Tyr His Glu Asn Leu Glu Asn Tyr Gln
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 Asn Ala Lys Lys Gln Ile Tyr Lys Asn Gln Thr Glu Glu Asp Tyr Leu
 210 215 220
 Ile Cys Asn Tyr His Gln Arg Gln Val Ile Glu Ser Glu Glu Leu Lys
 225 230 235 240
 Ala Lys Thr Leu Tyr Phe Ser Thr Gln Gln Glu Val Asp Gly Ile Tyr
 245 250 255
 Ile Lys Asp Gly Phe Ile Val Tyr Lys Gly Val Arg Ile Ile Asn Thr
 260 265 270
 Glu Asp Leu Val Leu Pro Gly Glu His Asn Leu Glu Asn Ile Leu Ala
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 290 295 300
 Asp Ser Leu Thr Thr Phe Ser Gly Ile Glu His Arg Leu Gln Tyr Val
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 Gly Thr Asn Arg Thr Asn Lys Tyr Tyr Asn Asp Ser Lys Ala Thr Asn
 325 330 335
 Thr Leu Ala Thr Gln Phe Ala Leu Asn Ser Phe Asn Gln Pro Ile Ile
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 Pro Tyr Met Glu Asn Val Arg Val Met Val Val Phe Gly Gln Thr Lys
 370 375 380
 Ala Lys Phe Ala Lys Leu Gly Asn Ser Gln Gly Lys Ser Val Ile Glu
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 Ala Asn Asn Val Glu Asp Ala Val Asp Lys Val Gln Asp Ile Ile Glu
 405 410 415
 Pro Asn Asp Val Val Leu Leu Ser Pro Ala Cys Ala Ser Trp Asp Gln
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 Tyr Ser Thr Phe Glu Glu Arg Gly Glu Lys Phe Ile Glu Arg Phe Arg
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 Ala His Leu Pro Ser Tyr
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<220>
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<220>
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 <212> DNA
 <213> Artificial Sequence

<220>
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<210> 12
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 <213> Artificial Sequence

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 <210> 13
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 <210> 14
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<210> 18
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<213> Staphylococcus aureus

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<212> PRT

<213> Staphylococcus aureus

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Ile Lys Ala Ile Ile Asp Ser Leu Thr Thr Phe
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<213> Staphylococcus aureus
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His Glu Val Gln Gly Ser Asp Ile Glu Asn Tyr Val Phe Thr Glu Val
          35                40                      45

Ala Leu Arg Asn Lys Gly Ile Lys Ile Leu Pro Phe Asp Ala Asn Asn
  50                55                      60

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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
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| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| His | Glu | Glu | Ile | Val | Arg | Ala | His | Gln | Leu | Lys | Leu | Asp | Val | Val | Ser | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
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| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Val | Met | Asn | Gly | Asp | Lys | Lys | Thr | Ser | Phe | Leu | Ile | Gly | Asp | Gly | Thr | |
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| Gly | Met | Gly | Leu | Pro | Glu | Ser | Asp | Tyr | Phe | Ala | Phe | Glu | Ala | Cys | Glu | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| Tyr | Arg | Arg | His | Phe | Leu | Ser | Tyr | Lys | Pro | Asp | Tyr | Ala | Ile | Met | Thr | |
| | | | 165 | | | | | | 170 | | | | | 175 | | |
| Asn | Ile | Asp | Phe | Asp | His | Pro | Asp | Tyr | Phe | Lys | Asp | Ile | Asn | Asp | Val | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Phe | Asp | Ala | Phe | Gln | Glu | Met | Ala | His | Asn | Val | Lys | Lys | Gly | Ile | Ile | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Ala | Trp | Gly | Asp | Asp | Glu | His | Leu | Arg | Lys | Ile | Glu | Ala | Asp | Val | Pro | |
| | 210 | | | | | 215 | | | | | 220 | | | | | |
| Ile | Tyr | Tyr | Tyr | Gly | Phe | Lys | Asp | Ser | Asp | Asp | Ile | Tyr | Ala | Gln | Asn | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| Ile | Gln | Ile | Thr | Asp | Lys | Gly | Thr | Ala | Phe | Asp | Val | Tyr | Val | Asp | Gly | |
| | | | 245 | | | | | | 250 | | | | | 255 | | |
| Glu | Phe | Tyr | Asp | His | Phe | Leu | Ser | Pro | Gln | Tyr | Gly | Asp | His | Thr | Val | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| Leu | Asn | Ala | Leu | Ala | Val | Ile | Ala | Ile | Ser | Tyr | Leu | Glu | Lys | Leu | Asp | |
| | | 275 | | | | | 280 | | | | | 285 | | | | |
| Val | Thr | Asn | Ile | Lys | Glu | Ala | Leu | Glu | Thr | Phe | Gly | Gly | Val | Lys | Arg | |
| | | 290 | | | | 295 | | | | | 300 | | | | | |
| Arg | Phe | Asn | Glu | Thr | Thr | Ile | Ala | Asn | Gln | Val | Ile | Val | Asp | Asp | Tyr | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | |
| Ala | His | His | Pro | Arg | Glu | Ile | Ser | Ala | Thr | Ile | Glu | Thr | Ala | Arg | Lys | |
| | | | | 325 | | | | | 330 | | | | | 335 | | |
| Lys | Tyr | Pro | His | Lys | Glu | Val | Val | Ala | Val | Phe | Gln | Pro | His | Thr | Phe | |
| | | | 340 | | | | | 345 | | | | | 350 | | | |
| Ser | Arg | Thr | Gln | Ala | Phe | Leu | Asn | Glu | Phe | Ala | Glu | Ser | Leu | Ser | Lys | |
| | | 355 | | | | | 360 | | | | | 365 | | | | |

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370 375 380

Thr Gly Ala Leu Thr Ile Gln Asp Leu Ile Asp Lys Ile Glu Gly Ala
385 390 395 400

Ser Leu Ile Asn Glu Asp Ser Ile Asn Val Leu Glu Gln Phe Asp Asn
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<212> DNA

<213> Staphylococcus aureus

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gatgctaata acataaaaga agatatggta gttatacaag gtaatgcatt cgcgagtagc 240
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gatcatcctg attattttta agatattaat gatgtttttg atgcattcca agaaatggca 600
cataatgtta aaaaagggtat tattgcttgg ggtgatgatg aacattttacg taaaattgaa 660
gcagatgttc caatttatta ttatggattt aaagattcgg atgacattta tgctcaaaat 720
attcaaatta cggataaagg tactgctttt gatgtgtatg tggatgggtga gttttatgat 780
cacttctgt ctccacaata tggtgacat acagttttta atgcattagc tgtaattgctg 840
attagttatt tagagaagct agatgttaca aatattaaag aagcattaga aacgttttgt 900
ggtgttaaac gtcgtttcaa tgaaactaca attgcaaadc aagttattgt agatgattat 960
gcacaccatc caagagaaat tagtgctaca attgaaacag cacgaaagaa atatccacat 1020
aaagaagttg ttgcagtatt tcaaccacac actttctcta gaacacaggc atttttaaat 1080
gaatttgcag aaagttttaag taaagcagat cgtgtattct tatgtgaaat ttttggatca 1140
attagagaaa atactggcgc attaacgata caagatttaa ttgataaaat tgaagggtgca 1200
tcgttaatta atgaagattc tattaatgta ttagaacaat ttgataatgc tgttatttta 1260
tttatgggtg caggtgatat tcaaaaatta caaatgcat atttagataa attaggcatg 1320
aaaaatgcgt tttaa                                     1335

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<210> 30

<211> 444

<212> PRT

<213> Staphylococcus aureus

<400> 30

Met Ser Lys Glu Phe Tyr Ile Met Thr His Tyr His Phe Val Gly Ile
1 5 10 15

Lys Gly Ser Gly Met Ser Ser Leu Ala Gln Ile Met His Asp Leu Gly
20 25 30

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| His | Glu | Val | Gln | Gly | Ser | Asp | Ile | Glu | Asn | Tyr | Val | Phe | Thr | Glu | Val |
| 35 | | | | | | 40 | | | | | | 45 | | | |
| Ala | Leu | Arg | Asn | Lys | Gly | Ile | Lys | Ile | Leu | Pro | Phe | Asp | Ala | Asn | Asn |
| 50 | | | | | | 55 | | | | 60 | | | | | |
| Ile | Lys | Glu | Asp | Met | Val | Val | Ile | Gln | Gly | Asn | Ala | Phe | Ala | Ser | Ser |
| 65 | | | | 70 | | | | | | 75 | | | | 80 | |
| His | Glu | Glu | Ile | Val | Arg | Ala | His | Gln | Leu | Lys | Leu | Asp | Val | Val | Ser |
| | | | | 85 | | | | 90 | | | | | | 95 | |
| Tyr | Asn | Asp | Phe | Leu | Gly | Gln | Ile | Ile | Asp | Gln | Tyr | Thr | Ser | Val | Ala |
| | | 100 | | | | | | 105 | | | | 110 | | | |
| Val | Thr | Gly | Ala | His | Gly | Lys | Thr | Ser | Thr | Thr | Gly | Leu | Leu | Ser | His |
| | | 115 | | | | 120 | | | | | | 125 | | | |
| Val | Met | Asn | Gly | Asp | Lys | Lys | Thr | Ser | Phe | Leu | Ile | Gly | Asp | Gly | Thr |
| 130 | | | | | | 135 | | | | 140 | | | | | |
| Gly | Met | Gly | Leu | Pro | Glu | Ser | Asp | Tyr | Phe | Ala | Phe | Glu | Ala | Cys | Glu |
| 145 | | | | 150 | | | | | | 155 | | | | 160 | |
| Tyr | Arg | Arg | His | Phe | Leu | Ser | Tyr | Lys | Pro | Asp | Tyr | Ala | Ile | Met | Thr |
| | | | | 165 | | | | 170 | | | | | | 175 | |
| Asn | Ile | Asp | Phe | Asp | His | Pro | Asp | Tyr | Phe | Lys | Asp | Ile | Asn | Asp | Val |
| | | 180 | | | | | | 185 | | | | 190 | | | |
| Phe | Asp | Ala | Phe | Gln | Glu | Met | Ala | His | Asn | Val | Lys | Lys | Gly | Ile | Ile |
| | | 195 | | | | 200 | | | | | | 205 | | | |
| Ala | Trp | Gly | Asp | Asp | Glu | His | Leu | Arg | Lys | Ile | Glu | Ala | Asp | Val | Pro |
| 210 | | | | | | 215 | | | | 220 | | | | | |
| Ile | Tyr | Tyr | Tyr | Gly | Phe | Lys | Asp | Ser | Asp | Asp | Ile | Tyr | Ala | Gln | Asn |
| 225 | | | | 230 | | | | | | 235 | | | | 240 | |
| Ile | Gln | Ile | Thr | Asp | Lys | Gly | Thr | Ala | Phe | Asp | Val | Tyr | Val | Asp | Gly |
| | | | | 245 | | | | 250 | | | | | | 255 | |
| Glu | Phe | Tyr | Asp | His | Phe | Leu | Ser | Pro | Gln | Tyr | Gly | Asp | His | Thr | Val |
| | | 260 | | | | 265 | | | | | | 270 | | | |
| Leu | Asn | Ala | Leu | Ala | Val | Ile | Ala | Ile | Ser | Tyr | Leu | Glu | Lys | Leu | Asp |
| | | 275 | | | | 280 | | | | | | 285 | | | |
| Val | Thr | Asn | Ile | Lys | Glu | Ala | Leu | Glu | Thr | Phe | Gly | Gly | Val | Lys | Arg |
| 290 | | | | | | 295 | | | | 300 | | | | | |
| Arg | Phe | Asn | Glu | Thr | Thr | Ile | Ala | Asn | Gln | Val | Ile | Val | Asp | Asp | Tyr |
| 305 | | | | 310 | | | | | | 315 | | | | 320 | |
| Ala | His | His | Pro | Arg | Glu | Ile | Ser | Ala | Thr | Ile | Glu | Thr | Ala | Arg | Lys |
| | | | | 325 | | | | 330 | | | | | | 335 | |

Lys Tyr Pro His Lys Glu Val Val Ala Val Phe Gln Pro His Thr Phe
 340 345 350
 Ser Arg Thr Gln Ala Phe Leu Asn Glu Phe Ala Glu Ser Leu Ser Lys
 355 360 365
 Ala Asp Arg Val Phe Leu Cys Glu Ile Phe Gly Ser Ile Arg Glu Asn
 370 375 380
 Thr Gly Ala Leu Thr Ile Gln Asp Leu Ile Asp Lys Ile Glu Gly Ala
 385 390 395 400
 Ser Leu Ile Asn Glu Asp Ser Ile Asn Val Leu Glu Gln Phe Asp Asn
 405 410 415
 Ala Val Ile Leu Phe Met Gly Ala Gly Asp Ile Gln Lys Leu Gln Asn
 420 425 430
 Ala Tyr Leu Asp Lys Leu Gly Met Lys Asn Ala Phe
 435 440

<210> 31
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 31
 gcggcggccc atatgacagt attaacagat aaagtag

37

<210> 32
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 32
 gcgcggatcc ttaaacaata tccaaaccac cgaatg

36

<210> 33
 <211> 35
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 33
 gcggcggccc atatgaagga gttttatata atgac 35

<210> 34
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 34
 gcggcggccc atatgtttta tataatgaca cactatc 37

<210> 35
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 35
 gcggcggccc atatgataat gacacactat cattttg 37

<210> 36
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 36
 gcggcggccc atatgacaca ctatcatttt gtcg 34

<210> 37
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 37
 gcggcggccc atatgtatca ttttgtcgga attaaag 37

<210> 38
 <211> 39
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 38
 gcgcggatcc atttttcatg cctaatttat ctaaatatg 39

<210> 39
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 39
 gcgcggatcc catgcctaatttatctctaaat atg 33

<210> 40
 <211> 43
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 40
 gcgcggatcc taattttatct aaatatgcat tttgtaattt ttg 43

<210> 41
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 41
 gcgcggatcc atctaaatat gcattttgta atttttg 37

<210> 42
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 42

gcgcggatcc atatgcattt tgtaattttt gaatatc

37

<210> 43

<211> 12

<212> PRT

<213> Staphylococcus aureus

<400> 43

His Lys Glu Val Val Ala Val Phe Gln Pro His Thr

1

5

10

<210> 44

<211> 13

<212> PRT

<213> Staphylococcus aureus

<400> 44

Lys Ala Asp Arg Val Phe Leu Cys Glu Ile Phe Gly Ser

1

5

10

<210> 45

<211> 19

<212> PRT

<213> Staphylococcus aureus

<400> 45

Asp His Thr Val Leu Asn Ala Leu Ala Val Ile Ala Ile Ser Tyr Leu

1

5

10

15

Glu Lys Leu

<210> 46

<211> 924

<212> DNA

<213> Staphylococcus aureus

<400> 46

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gtgataaata aagacatcta tcaagcttta caacaactta tcccaaataa aaaaattaaa 60
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attacccta ctaaaaatga agaagtacaa gcagttgtta aatatgccta tcaaatgag 180
attcctgtta catatttagg aaatggctca aatattatta tccgtgaagg tggatttcgc 240
ggatttgtaa ttagtttatt atcactagat catatcgaag tatctgatga tgcgataata 300
gccggtagcg gcgctgcaat tattgatgtc tcacgtgttg ctcttgatta cgcacttact 360
ggccttgaat ttgcatgtgg tattccaggt tcaattgggt gtgcagtgtg tatgaatgct 420
ggcgcttatg gtggcgaagt taaagattgt atagactatg cgctttgcgt aaacgaacaa 480
ggctcgtaa ttaaaacttac aacaaaagaa ttagagtttag attatcgtaa tagcattatt 540
caaaaagaac acttagttgt attagaagct gcatttactt tagctcctgg taaaatgact 600
gaaatacaag ctaaaatgga tgatttaaca gaacgtagag aatctaaaca accttttagag 660

```

```

tattccttcat gtggtagtgt attccaaaga ccgcctgggc attttgcagg taaattgata 720
caagattcta atttgcaagg tcaccgtatt ggcggcggtg aagtttcaac caaacacgct 780
ggtttttatgg taaatgtaga caatggaact gctacagatt atgaaaacct tattcattat 840
gtacaaaaga ccgtcaaaga aaaatttggc attgaattaa atcgtgaagt tcgcattatt 900
ggtgaacatc caaaggaatc gtaa                                     924

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<210> 47

<211> 307

<212> PRT

<213> *Staphylococcus aureus*

<400> 47

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Val Ile Asn Lys Asp Ile Tyr Gln Ala Leu Gln Gln Leu Ile Pro Asn
  1                               5          10          15

Glu Lys Ile Lys Val Asp Glu Pro Leu Lys Arg Tyr Thr Tyr Thr Lys
          20          25          30

Thr Gly Gly Asn Ala Asp Phe Tyr Ile Thr Pro Thr Lys Asn Glu Glu
          35          40          45

Val Gln Ala Val Val Lys Tyr Ala Tyr Gln Asn Glu Ile Pro Val Thr
          50          55          60

Tyr Leu Gly Asn Gly Ser Asn Ile Ile Ile Arg Glu Gly Gly Ile Arg
  65          70          75          80

Gly Ile Val Ile Ser Leu Leu Ser Leu Asp His Ile Glu Val Ser Asp
          85          90          95

Asp Ala Ile Ile Ala Gly Ser Gly Ala Ala Ile Ile Asp Val Ser Arg
          100          105          110

Val Ala Leu Asp Tyr Ala Leu Thr Gly Leu Glu Phe Ala Cys Gly Ile
          115          120          125

Pro Gly Ser Ile Gly Gly Ala Val Tyr Met Asn Ala Gly Ala Tyr Gly
          130          135          140

Gly Glu Val Lys Asp Cys Ile Asp Tyr Ala Leu Cys Val Asn Glu Gln
          145          150          155          160

Gly Ser Leu Ile Lys Leu Thr Thr Lys Glu Leu Glu Leu Asp Tyr Arg
          165          170          175

Asn Ser Ile Ile Gln Lys Glu His Leu Val Val Leu Glu Ala Ala Phe
          180          185          190

Thr Leu Ala Pro Gly Lys Met Thr Glu Ile Gln Ala Lys Met Asp Asp
          195          200          205

Leu Thr Glu Arg Arg Glu Ser Lys Gln Pro Leu Glu Tyr Pro Ser Cys
          210          215          220

Gly Ser Val Phe Gln Arg Pro Pro Gly His Phe Ala Gly Lys Leu Ile
          225          230          235          240

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Gln Asp Ser Asn Leu Gln Gly His Arg Ile Gly Gly Val Glu Val Ser
 245 250 255

Thr Lys His Ala Gly Phe Met Val Asn Val Asp Asn Gly Thr Ala Thr
 260 265 270

Asp Tyr Glu Asn Leu Ile His Tyr Val Gln Lys Thr Val Lys Glu Lys
 275 280 285

Phe Gly Ile Glu Leu Asn Arg Glu Val Arg Ile Ile Gly Glu His Pro
 290 295 300

Lys Glu Ser
 305

<210> 48

<211> 924

<212> DNA

<213> Staphylococcus aureus

<400> 48

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gtgataaata aagacatcta tcaagcttta caacaactta tcccaaataa aaaaattaaa 60
gttgatgaac ctttaaaacg atacacttat actaaaacag gtggtaatgc cgactttttac 120
attaccctta ctaaaaatga agaagtacaa gcagttgtta aatatgccta tcgaaatgag 180
attcctgtta catatcttagg aaatggctca aatattatta tccgtgaagg tggatttcgc 240
ggtattgtaa ttagttttatt accactagat catatcgaag tatctgatga tgcgataata 300
gccggtagcg gcgctgcaat tattgatgtc tcacgtgttg ctctgtgatta cgcacttact 360
ggccttgaat ttgcatgtgg tattccagggt tcaattgggtg gtgcagtgtg tatgaatgct 420
ggcgcttatg gtggcgaagt taaagattgt atagactatg cgctttgcgt aaacgaacaa 480
ggctcgtaa ttaaaacttac aacaaaagaa ttagagttag attatcgtaa tagcattatt 540
caaaaagaac acttagttgt attagaagct gcattttactt tagctcctgg taaaatgact 600
gaaatacaag ctaaaatgga tgatttaaca gaacgtagag aatctaaaaca accttttagag 660
tattccttcat gtggtagtgt attccaaaga ccgcctgggc attttgcagg taaattgata 720
caagattcta atttgcaagg tcaccgtatt ggccggcggtg aagtttcaac caaacacgct 780
ggtttttatg taaatgtaga caatggaact gctacagatt atgaaaacct tattcattat 840
gtacaaaaga ccgtcaaaga aaaatctggc attgaattaa atcgtgaagt tcgcattatt 900
ggtgaacatc caaaggaatc gtaa                                     924

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<210> 49

<211> 307

<212> PRT

<213> Staphylococcus aureus

<400> 49

Val Ile Asn Lys Asp Ile Tyr Gln Ala Leu Gln Gln Leu Ile Pro Asn
 1 5 10 15

Glu Lys Ile Lys Val Asp Glu Pro Leu Lys Arg Tyr Thr Tyr Thr Lys
 20 25 30

Thr Gly Gly Asn Ala Asp Phe Tyr Ile Thr Pro Thr Lys Asn Glu Glu
 35 40 45

Val Gln Ala Val Val Lys Tyr Ala Tyr Arg Asn Glu Ile Pro Val Thr
 50 55 60

Tyr Leu Gly Asn Gly Ser Asn Ile Ile Ile Arg Glu Gly Gly Ile Arg
 65 70 75 80
 Gly Ile Val Ile Ser Leu Leu Pro Leu Asp His Ile Glu Val Ser Asp
 85 90 95
 Asp Ala Ile Ile Ala Gly Ser Gly Ala Ala Ile Ile Asp Val Ser Arg
 100 105 110
 Val Ala Arg Asp Tyr Ala Leu Thr Gly Leu Glu Phe Ala Cys Gly Ile
 115 120 125
 Pro Gly Ser Ile Gly Gly Ala Val Tyr Met Asn Ala Gly Ala Tyr Gly
 130 135 140
 Gly Glu Val Lys Asp Cys Ile Asp Tyr Ala Leu Cys Val Asn Glu Gln
 145 150 155 160
 Gly Ser Leu Ile Lys Leu Thr Thr Lys Glu Leu Glu Leu Asp Tyr Arg
 165 170 175
 Asn Ser Ile Ile Gln Lys Glu His Leu Val Val Leu Glu Ala Ala Phe
 180 185 190
 Thr Leu Ala Pro Gly Lys Met Thr Glu Ile Gln Ala Lys Met Asp Asp
 195 200 205
 Leu Thr Glu Arg Arg Glu Ser Lys Gln Pro Leu Glu Tyr Pro Ser Cys
 210 215 220
 Gly Ser Val Phe Gln Arg Pro Pro Gly His Phe Ala Gly Lys Leu Ile
 225 230 235 240
 Gln Asp Ser Asn Leu Gln Gly His Arg Ile Gly Gly Val Glu Val Ser
 245 250 255
 Thr Lys His Ala Gly Phe Met Val Asn Val Asp Asn Gly Thr Ala Thr
 260 265 270
 Asp Tyr Glu Asn Leu Ile His Tyr Val Gln Lys Thr Val Lys Glu Lys
 275 280 285
 Phe Gly Ile Glu Leu Asn Arg Glu Val Arg Ile Ile Gly Glu His Pro
 290 295 300
 Lys Glu Ser
 305

<210> 50

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 50
gcggcggccc atatggataa ctacacctat agc 33

<210> 51
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 51
gcgcgggatcc ttagagttca aacaattcta cgctttc 37

<210> 52
<211> 8
<212> PRT
<213> Staphylococcus aureus

<400> 52
Val Gln Ala Val Val Lys Tyr Ala
1 5

<210> 53
<211> 14
<212> PRT
<213> Staphylococcus aureus

<400> 53
Val Lys Asp Cys Ile Asp Tyr Ala Leu Cys Val Asn Glu Gln
1 5 10

<210> 54
<211> 52
<212> PRT
<213> Staphylococcus aureus

<400> 54
Arg Gly Ile Val Ile Ser Leu Leu Ser Leu Asp His Ile Glu Val Ser
1 5 10 15

Asp Asp Ala Ile Ile Ala Gly Ser Gly Ala Ala Ile Ile Asp Val Ser
20 25 30

Arg Val Ala Leu Asp Tyr Ala Leu Thr Gly Leu Glu Phe Ala Cys Gly
35 40 45

Ile Pro Gly Ser
50

<210> 55
 <211> 921
 <212> DNA
 <213> *Staphylococcus aureus*

<400> 55
 atgacaagaa aaggatatgg ggaatcgaca ggtaagatta ttttaatagg agaacatgct 60
 gttacatttg gagagcctgc tattgcagta ccgtttaacg caggtaaaat caaagtttta 120
 atagaagcct tagagagcgg gaactattcg tctattaaaa gcgatgttta cgatgggtatg 180
 ttatatgatg cgcttgacca tcttaagtct ttgggtgaacc gttttgtaga attaaataat 240
 attacagagc cgctagcagt aacgatccaa acgaatttac caccatcacg tggattagga 300
 tcgagtgcag ctgtcgcggg tgcttttggt cgtgcaagtt atgatttttt agggaaatca 360
 ttaacgaaag aagaactcat tgaaaaggct aattgggcag agcaaattgc acatgggtaaa 420
 ccaagtggta ttgatacgca aacgattgta tcaggcaaac cagtttggtt ccaaaaaggt 480
 catgctgaaa cgttgaaaac gttaagttta gacggctata tggttgttat agatactggg 540
 gtgaaagggt caacaagaca agcagtagaa gatgttcata aactttgtga ggaccctcag 600
 tacatgtcac atgtaaaaca tatcggttaag ttagttttac gtgtagagtg tgtgattgaa 660
 catcataact ttgaagcctt agcggatatt ttaaatgaat gtcatgcgga tttaaaggcg 720
 ttgacagtta gtcagtataa aatagaacaa ttaatgaaaa ttggtaaaga aaatgggtgcg 780
 attgctggaa aacttactgg cgctggctcg ggtggaagta tgttattgct tgccaaagat 840
 ttaccaacag cgaaaaatat tgtaaaagct gtagaaaaag ctgggtgcagc acatacttgg 900
 attgagaatt taggaggtta a 921

<210> 56
 <211> 306
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 56
 Met Thr Arg Lys Gly Tyr Gly Glu Ser Thr Gly Lys Ile Ile Leu Ile
 1 5 10 15
 Gly Glu His Ala Val Thr Phe Gly Glu Pro Ala Ile Ala Val Pro Phe
 20 25 30
 Asn Ala Gly Lys Ile Lys Val Leu Ile Glu Ala Leu Glu Ser Gly Asn
 35 40 45
 Tyr Ser Ser Ile Lys Ser Asp Val Tyr Asp Gly Met Leu Tyr Asp Ala
 50 55 60
 Pro Asp His Leu Lys Ser Leu Val Asn Arg Phe Val Glu Leu Asn Asn
 65 70 75 80
 Ile Thr Glu Pro Leu Ala Val Thr Ile Gln Thr Asn Leu Pro Pro Ser
 85 90 95
 Arg Gly Leu Gly Ser Ser Ala Ala Val Ala Val Ala Phe Val Arg Ala
 100 105 110
 Ser Tyr Asp Phe Leu Gly Lys Ser Leu Thr Lys Glu Glu Leu Ile Glu
 115 120 125
 Lys Ala Asn Trp Ala Glu Gln Ile Ala His Gly Lys Pro Ser Gly Ile
 130 135 140

Asp Thr Gln Thr Ile Val Ser Gly Lys Pro Val Trp Phe Gln Lys Gly
 145 150 155 160
 His Ala Glu Thr Leu Lys Thr Leu Ser Leu Asp Gly Tyr Met Val Val
 165 170 175
 Ile Asp Thr Gly Val Lys Gly Ser Thr Arg Gln Ala Val Glu Asp Val
 180 185 190
 His Lys Leu Cys Glu Asp Pro Gln Tyr Met Ser His Val Lys His Ile
 195 200 205
 Gly Lys Leu Val Leu Arg Ala Ser Asp Val Ile Glu His His Asn Phe
 210 215 220
 Glu Ala Leu Ala Asp Ile Phe Asn Glu Cys His Ala Asp Leu Lys Ala
 225 230 235 240
 Leu Thr Val Ser His Asp Lys Ile Glu Gln Leu Met Lys Ile Gly Lys
 245 250 255
 Glu Asn Gly Ala Ile Ala Gly Lys Leu Thr Gly Ala Gly Arg Gly Gly
 260 265 270
 Ser Met Leu Leu Leu Ala Lys Asp Leu Pro Thr Ala Lys Asn Ile Val
 275 280 285
 Lys Ala Val Glu Lys Ala Gly Ala Ala His Thr Trp Ile Glu Asn Leu
 290 295 300
 Gly Gly
 305

<210> 57
 <211> 921
 <212> DNA
 <213> Staphylococcus aureus

<400> 57
 atgacaagaa aaggatatgg ggaatcgaca ggtaagatta ttttaatatagg agaacatgct 60
 gttacatttg gagagcctgc tattgcagta ccgtttaacg caggtaaaat caaagtttta 120
 atagaagcct tagagagcgg gaactattcg tctattaaaa gcgatgttta cgatggtagt 180
 ttatatgatg cgctgacca tcttaagtct ttggtgaacc gttttgtaga attaaataat 240
 attacagagc cgctagcagt aacgatccaa acgaatttac caccatcacg tggattagga 300
 tcgagtgcag ctgtcgcggt tgcttttggt cgtgcaagtt atgatttttt agggaaatca 360
 ttaacgaaag aagaactcat tgaagggt aattgggcag agcaaattgc acatggtaaa 420
 ccaagtggta ttgatacgca aacgattgta tcaggcaaac cagtttggtt ccaaaaaggt 480
 catgctgaaa cgttgaaaac gttaagttaa gacggctata tggttgttat agatactggg 540
 gtgaaagggg caacaagaca agcagtagaa gatgttcata aactttgtga ggaccctcag 600
 tacatgtcac atgtaaaaca tatcggttaag ttagttttac gtgcgagtga tgtgattgaa 660
 catcataact ttgaagcctt agcggatatt tttaatgaat gtcatgcgga tttaaaggcg 720
 ttgacagtta gtcatgataa aatagaacaa ttaatgaaaa ttggtaaaga aaatgggtgcg 780
 attgctggaa aacttactgg cgctggctgt ggtggaagta tgttattgct tgccaaagat 840
 ttaccaacag cgaaaaatat tgaaaaagct gtagaaaaag ctggtgcagc acatacttgg 900
 attgagaatt taggaggtta a 921

<210> 58
 <211> 306
 <212> PRT
 <213> Staphylococcus aureus

<400> 58
 Met Thr Arg Lys Gly Tyr Gly Glu Ser Thr Gly Lys Ile Ile Leu Ile
 1 5 10 15
 Gly Glu His Ala Val Thr Phe Gly Glu Pro Ala Ile Ala Val Pro Phe
 20 25 30
 Asn Ala Gly Lys Ile Lys Val Leu Ile Glu Ala Leu Glu Ser Gly Asn
 35 40 45
 Tyr Ser Ser Ile Lys Ser Asp Val Tyr Asp Gly Met Leu Tyr Asp Ala
 50 55 60
 Pro Asp His Leu Lys Ser Leu Val Asn Arg Phe Val Glu Leu Asn Asn
 65 70 75 80
 Ile Thr Glu Pro Leu Ala Val Thr Ile Gln Thr Asn Leu Pro Pro Ser
 85 90 95
 Arg Gly Leu Gly Ser Ser Ala Ala Val Ala Val Ala Phe Val Arg Ala
 100 105 110
 Ser Tyr Asp Phe Leu Gly Lys Ser Leu Thr Lys Glu Glu Leu Ile Glu
 115 120 125
 Lys Ala Asn Trp Ala Glu Gln Ile Ala His Gly Lys Pro Ser Gly Ile
 130 135 140
 Asp Thr Gln Thr Ile Val Ser Gly Lys Pro Val Trp Phe Gln Lys Gly
 145 150 155 160
 His Ala Glu Thr Leu Lys Thr Leu Ser Leu Asp Gly Tyr Met Val Val
 165 170 175
 Ile Asp Thr Gly Val Lys Gly Ser Thr Arg Gln Ala Val Glu Asp Val
 180 185 190
 His Lys Leu Cys Glu Asp Pro Gln Tyr Met Ser His Val Lys His Ile
 195 200 205
 Gly Lys Leu Val Leu Arg Ala Ser Asp Val Ile Glu His His Asn Phe
 210 215 220
 Glu Ala Leu Ala Asp Ile Phe Asn Glu Cys His Ala Asp Leu Lys Ala
 225 230 235 240
 Leu Thr Val Ser His Asp Lys Ile Glu Gln Leu Met Lys Ile Gly Lys
 245 250 255
 Glu Asn Gly Ala Ile Ala Gly Lys Leu Thr Gly Ala Gly Arg Gly Gly
 260 265 270

Ser Met Leu Leu Leu Ala Lys Asp Leu Pro Thr Ala Lys Asn Ile Val
 275 280 285 .

Lys Ala Val Glu Lys Ala Gly Ala Ala His Thr Trp Ile Glu Asn Leu
 290 295 300

Gly Gly
 305

<210> 59

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 59

gcggcggccc atatgacaag aaaaggatat ggg

33

<210> 60

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 60

gcgcggatcc cggtctgtga atattattta attc

34

<210> 61

<211> 20

<212> PRT

<213> Staphylococcus aureus

<400> 61

Ser Ser Ala Ala Val Ala Val Ala Phe Val Arg Ala Ser Tyr Asp Phe
 1 5 10 15

Leu Gly Lys Ser
 20

<210> 62

<211> 16

<212> PRT

<213> Staphylococcus aureus

<400> 62

Thr Leu Lys Thr Leu Ser Leu Asp Gly Tyr Met Val Val Ile Asp Thr
 1 5 10 15

```
<210> 63
<211> 21
<212> PRT
<213> Staphylococcus aureus
```

```
<400> 63
Tyr Met Ser His Val Lys His Ile Gly Lys Leu Val Leu Arg Ala Ser
  1             5             10            15
```

Asp Val Ile Glu His
20

```
<210> 64
<211> 960
<212> DNA
<213> Escherichia coli
```

| <400> 64 | | | | | | |
|-------------|------------|-------------|-------------|-------------|-------------|-----|
| atgagtctga | atttccttga | ttttgaacag | ccgattgcag | agctggaagc | gaaaatcgat | 60 |
| tctctgactg | cggttagccg | tcaggatgag | aaactggata | ttaacatcga | tgaagaagtg | 120 |
| catcgtctgc | gtgaaaaaag | cgtgaagaatc | acacgtaaaa | tcttcgccga | tctcggtgca | 180 |
| tggcagattg | cgcaactggc | agccatccca | cagcgtcctt | atacccttga | ttaaccttcg | 240 |
| ctggcatttg | atgaatttga | cgaactggct | ggcgaccgcg | cgtatgcaga | cgataaagct | 300 |
| atcgtcggtg | gtatcgcccg | tctcgatggg | cgtccgggtg | tgatcattgg | tcataaaaa | 360 |
| ggtcgtgaaa | ccaaagaaaa | aattcgccgt | aactttggta | tgccagcgcc | agaaggttac | 420 |
| cgaaagcac | tgcgtctgat | gcaaattggct | gaacgcttta | agatgcctat | catcaccttt | 480 |
| atcgacaccc | cgggggctta | tcttggcgtg | ggcgacagaag | agcgtgggtca | gtctgaagcc | 540 |
| attgcacgca | acctcgtgga | aatgtctcgc | ctcggcgtac | cggtagtttg | tacggttatc | 600 |
| ggtgaagggtg | gttctggtcg | tgcgtggcg | attggcgtgg | gcgataaagt | gaatatgctg | 660 |
| caatacagca | cctattccgt | tatctcgccg | gaaggtttg | cgtccattct | gtggaagagc | 720 |
| gccgacaaa | cgccgtggc | ggctgaagcg | atgggtatca | tgtctccgcg | tctgaaagaa | 780 |
| ctgaaaactga | tcgactccat | catcccggaa | ccactggggtg | gtgctcaccg | taacccgtaa | 840 |
| gcgattggcgg | catcgttgaa | agcgcgaactg | ctggcggatc | tggccgatct | cgacgtgtta | 900 |
| agcactgaag | attttaaaaa | tcgtcgttat | cagcgcctga | tgaactacgg | ttaacgcgtaa | 960 |

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<210> 65
<211> 319
<212> PRT
<213> Escherichia coli
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<400> 65
Met Ser Leu Asn Phe Leu Asp Phe Glu Gln Pro Ile Ala Glu Leu Glu
1 5 10 15

Ala Lys Ile Asp Ser Leu Thr Ala Val Ser Arg Gln Asp Glu Lys Leu
20 25 30

Asp Ile Asn Ile Asp Glu Glu Val His Arg Leu Arg Glu Lys Ser Val
35 40 45

Glu Leu Thr Arg Lys Ile Phe Ala Asp Leu Gly Ala Trp Gln Ile Ala
50 55 60

Gln Leu Ala Arg His Pro Gln Arg Pro Tyr Thr Leu Asp Tyr Val Arg
65 70 75 80

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Ala | Phe | Asp | Glu | Phe | Asp | Glu | Leu | Ala | Gly | Asp | Arg | Ala | Tyr | Ala | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| Asp | Asp | Lys | Ala | Ile | Val | Gly | Gly | Ile | Ala | Arg | Leu | Asp | Gly | Arg | Pro | |
| | | | 100 | | | | 105 | | | | 110 | | | | | |
| Val | Met | Ile | Ile | Gly | His | Gln | Lys | Gly | Arg | Glu | Thr | Lys | Glu | Lys | Ile | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Arg | Arg | Asn | Phe | Gly | Met | Pro | Ala | Pro | Glu | Gly | Tyr | Arg | Lys | Ala | Leu | |
| | | 130 | | | | 135 | | | | | 140 | | | | | |
| Arg | Leu | Met | Gln | Met | Ala | Glu | Arg | Phe | Lys | Met | Pro | Ile | Ile | Thr | Phe | |
| | | 145 | | | | 150 | | | | 155 | | | | | 160 | |
| Ile | Asp | Thr | Pro | Gly | Ala | Tyr | Pro | Gly | Val | Gly | Ala | Glu | Glu | Arg | Gly | |
| | | | | 165 | | | | | 170 | | | | | 175 | | |
| Gln | Ser | Glu | Ala | Ile | Ala | Arg | Asn | Leu | Arg | Glu | Met | Ser | Arg | Leu | Gly | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Val | Pro | Val | Val | Cys | Thr | Val | Ile | Gly | Glu | Gly | Gly | Ser | Gly | Gly | Ala | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Leu | Ala | Ile | Gly | Val | Gly | Asp | Lys | Val | Asn | Met | Leu | Gln | Tyr | Ser | Thr | |
| | | 210 | | | | 215 | | | | | 220 | | | | | |
| Tyr | Ser | Val | Ile | Ser | Pro | Glu | Gly | Cys | Ala | Ser | Ile | Leu | Trp | Lys | Ser | |
| | | 225 | | | | 230 | | | | | 235 | | | | | 240 |
| Ala | Asp | Lys | Ala | Pro | Leu | Ala | Ala | Glu | Ala | Met | Gly | Ile | Ile | Ala | Pro | |
| | | | | 245 | | | | | 250 | | | | | 255 | | |
| Arg | Leu | Lys | Glu | Leu | Lys | Leu | Ile | Asp | Ser | Ile | Ile | Pro | Glu | Pro | Leu | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| Gly | Gly | Ala | His | Arg | Asn | Pro | Glu | Ala | Met | Ala | Ala | Ser | Leu | Lys | Ala | |
| | | 275 | | | | | 280 | | | | | 285 | | | | |
| Gln | Leu | Leu | Ala | Asp | Leu | Ala | Asp | Leu | Asp | Val | Leu | Ser | Thr | Glu | Asp | |
| | | 290 | | | | 295 | | | | | 300 | | | | | |
| Leu | Lys | Asn | Arg | Arg | Tyr | Gln | Arg | Leu | Met | Ser | Tyr | Gly | Tyr | Ala | | |
| | | 305 | | | | 310 | | | | | 315 | | | | | |

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<210> 66
<211> 960
<212> DNA
<213> Escherichia coli
```

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<400> 66
atgagtctga atttccttga ttttgaacag ccgattgcag agctggaagc gaaaatcgat 60
tctctgactg cggtagccg tcaggatgag aaactggata ttaacatcga tgaagaagtg 120
ctcgtctcgc gtgaaaaaag cgtagaactg acacgtaaaa tcttcgccga tctcggtgca 180
tggcagattg cgcaactggc acgccatcca cagcgtcctt ataccttgga ttacgttcgc 240
ctggcatttg atgaatttga cgaactggct ggcgaccgcg ccatatgcaga cgataaaqct 300
```

```

atcgtcgggtg gtatcgccccg tctcgatggt cgtccgggtga tgatcattgg tcatcaaaaa 360
ggtcgtgaaa ccaaagaaaa aattcgccgt aactttggta tgccagcgcc agaaggttac 420
cgcaaagcac tgcgtctgat gcaaattggct gaacgcttta agatgcctat catcaccttt 480
atcgacaccc cgggggctta tcttggcgtg ggcgcagaag agcgtgggtca gtctgaagcc 540
attgcacgca acctgcgtga aatgtctcgc ctccggctac cggtagtttg tacggttatc 600
ggtgaagggtg gttctggcgg tgcgctggcg attggcgtgg gcgataaagt gaatatgctg 660
caatacagca cctattccgt tatctcgccg gaaggttgtg cgtccattct gtggaagagc 720
gccgacaaag cgccgctggc ggctgaagcg atgggtatca ttgctccgcg tctgaaagaa 780
ctgaaactga tcgactccat catcccgga ccactgggtg gtgctcaccg taacccgga 840
gcgatggcgg catcgttgaa agcgcaactg ctggcggatc tggccgatct cgacgtgtta 900
agcactgaag atttaaaaaa tcgtcgttat cagcgctga tgagctacgg ttacgcgtaa 960

```

<210> 67

<211> 319

<212> PRT

<213> Escherichia coli

<400> 67

```

Met Ser Leu Asn Phe Leu Asp Phe Glu Gln Pro Ile Ala Glu Leu Glu
  1                      5                      10                      15

Ala Lys Ile Asp Ser Leu Thr Ala Val Ser Arg Gln Asp Glu Lys Leu
      20                      25                      30

Asp Ile Asn Ile Asp Glu Glu Val His Arg Leu Arg Glu Lys Ser Val
      35                      40                      45

Glu Leu Thr Arg Lys Ile Phe Ala Asp Leu Gly Ala Trp Gln Ile Ala
      50                      55                      60

Gln Leu Ala Arg His Pro Gln Arg Pro Tyr Thr Leu Asp Tyr Val Arg
      65                      70                      75                      80

Leu Ala Phe Asp Glu Phe Asp Glu Leu Ala Gly Asp Arg Ala Tyr Ala
      85                      90                      95

Asp Asp Lys Ala Ile Val Gly Gly Ile Ala Arg Leu Asp Gly Arg Pro
      100                      105                      110

Val Met Ile Ile Gly His Gln Lys Gly Arg Glu Thr Lys Glu Lys Ile
      115                      120                      125

Arg Arg Asn Phe Gly Met Pro Ala Pro Glu Gly Tyr Arg Lys Ala Leu
      130                      135                      140

Arg Leu Met Gln Met Ala Glu Arg Phe Lys Met Pro Ile Ile Thr Phe
      145                      150                      155                      160

Ile Asp Thr Pro Gly Ala Tyr Pro Gly Val Gly Ala Glu Glu Arg Gly
      165                      170                      175

Gln Ser Glu Ala Ile Ala Arg Asn Leu Arg Glu Met Ser Arg Leu Gly
      180                      185                      190

Val Pro Val Val Cys Thr Val Ile Gly Glu Gly Gly Ser Gly Gly Ala
      195                      200                      205

```

Leu Ala Ile Gly Val Gly Asp Lys Val Asn Met Leu Gln Tyr Ser Thr
 210 215 220
 Tyr Ser Val Ile Ser Pro Glu Gly Cys Ala Ser Ile Leu Trp Lys Ser
 225 230 235 240
 Ala Asp Lys Ala Pro Leu Ala Ala Glu Ala Met Gly Ile Ile Ala Pro
 245 250 255
 Arg Leu Lys Glu Leu Lys Leu Ile Asp Ser Ile Ile Pro Glu Pro Leu
 260 265 270
 Gly Gly Ala His Arg Asn Pro Glu Ala Met Ala Ala Ser Leu Lys Ala
 275 280 285
 Gln Leu Leu Ala Asp Leu Ala Asp Leu Asp Val Leu Ser Thr Glu Asp
 290 295 300
 Leu Lys Asn Arg Arg Tyr Gln Arg Leu Met Ser Tyr Gly Tyr Ala
 305 310 315

<210> 68
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 68
 gcggcgcccc atatgagtct gaatttcctt gattttg

37

<210> 69
 <211> 29
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 69
 gcgcggatcc atcaaagcc aggcgaacg

29

<210> 70
 <211> 11
 <212> PRT
 <213> Escherichia coli

<400> 70
 Arg Leu Gly Val Pro Val Val Cys Thr Val Ile
 1 5 10

<210> 71
 <211> 21
 <212> PRT
 <213> Escherichia coli

<400> 71
 Ala Ala Ser Leu Lys Ala Gln Leu Leu Ala Asp Leu Ala Asp Leu Asp
 1 5 10 15
 Val Leu Ser Thr Glu
 20

<210> 72
 <211> 30
 <212> PRT
 <213> Escherichia coli

<400> 72
 Phe Ala Asp Leu Gly Ala Trp Gln Ile Ala Gln Leu Ala Arg His Pro
 1 5 10 15
 Gln Arg Pro Tyr Thr Leu Asp Tyr Val Arg Leu Ala Phe Asp
 20 25 30

<210> 73
 <211> 945
 <212> DNA
 <213> Staphylococcus aureus

<400> 73
 atggttagatt ttgaaaaacc acttttttgaa attcgaaata aaattgaatc tttaaaagaa 60
 tctcaagata aaaatgatgt ggatttacaa gaagaaattg acatgcttga agcgtcattg 120
 gaacgagaaa ctaaaaaaat atatacaaat ctaaaaccat gggatcgtgt gcaaattgcg 180
 cgtttgcaag aaagacctac gaccctagat tatattccat atatctttga ttcgtttatg 240
 gaactacatg gtgatcgtaa ttttagagat gatccagcaa tgattggtgg tattggcttt 300
 ttaaattggtc gtgctgttac agttattgga caacaacgtg gaaaagatac aaaagataat 360
 atttatcgaa attttggtat ggcgcattcca gaaggttatc gaaaagcatt acgtttaatg 420
 aaacaagctg aaaaattcaa tcgtcctatc tttacattta tagatacaaa aggtgcatat 480
 cctggtaaag ctgctgaaga acgtggacaa agtgaatcta tcgcaacaaa tttgattgag 540
 atggcttcat taaaagtacc agttattgcg attgtcattg gtgaagggtg cagtggaggt 600
 gctctaggta ttggtattgc caataaagta ttgatgttag agaatagtag ttactctgtt 660
 atatctcctg aagggtgcagc ggcatatta tggaaagaca gtaatttggc taaaattgca 720
 gctgaaacaa tgaaaattac tgcccatgat attaagcaat taggtattat agatgatgtc 780
 atttctgaac cacttggcgg tgacacataaa gatattgaac agcaagcttt agctattaaa 840
 tcagcgtttg ttgcacagtt agattcactt gagtcattat cacgtgatga aattgctaata 900
 gatcgctttg aaaaattcag aaatatcggt tcttatatag aataa 945

<210> 74
 <211> 314
 <212> PRT
 <213> Staphylococcus aureus

<400> 74

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Met Leu Asp Phe Glu Lys Pro Leu Phe Glu Ile Arg Asn Lys Ile Glu
 1           5           10           15

Ser Leu Lys Glu Ser Gln Asp Lys Asn Asp Val Asp Leu Gln Glu Glu
      20           25           30

Ile Asp Met Leu Glu Ala Ser Leu Glu Arg Glu Thr Lys Lys Ile Tyr
      35           40           45

Thr Asn Leu Lys Pro Trp Asp Arg Val Gln Ile Ala Arg Leu Gln Glu
      50           55           60

Arg Pro Thr Thr Leu Asp Tyr Ile Pro Tyr Ile Phe Asp Ser Phe Met
      65           70           75           80

Glu Leu His Gly Asp Arg Asn Phe Arg Asp Asp Pro Ala Met Ile Gly
      85           90           95

Gly Ile Gly Phe Leu Asn Gly Arg Ala Val Thr Val Ile Gly Gln Gln
      100          105          110

Arg Gly Lys Asp Thr Lys Asp Asn Ile Tyr Arg Asn Phe Gly Met Ala
      115          120          125

His Pro Glu Gly Tyr Arg Lys Ala Leu Arg Leu Met Lys Gln Ala Glu
      130          135          140

Lys Phe Asn Arg Pro Ile Phe Thr Phe Ile Asp Thr Lys Gly Ala Tyr
      145          150          155          160

Pro Gly Lys Ala Ala Glu Glu Arg Gly Gln Ser Glu Ser Ile Ala Thr
      165          170          175

Asn Leu Ile Glu Met Ala Ser Leu Lys Val Pro Val Ile Ala Ile Val
      180          185          190

Ile Gly Glu Gly Gly Ser Gly Gly Ala Leu Gly Ile Gly Ile Ala Asn
      195          200          205

Lys Val Leu Met Leu Glu Asn Ser Thr Tyr Ser Val Ile Ser Pro Glu
      210          215          220

Gly Ala Ala Ala Leu Leu Trp Lys Asp Ser Asn Leu Ala Lys Ile Ala
      225          230          235          240

Ala Glu Thr Met Lys Ile Thr Ala His Asp Ile Lys Gln Leu Gly Ile
      245          250          255

Ile Asp Asp Val Ile Ser Glu Pro Leu Gly Gly Ala His Lys Asp Ile
      260          265          270

Glu Gln Gln Ala Leu Ala Ile Lys Ser Ala Phe Val Ala Gln Leu Asp
      275          280          285

Ser Leu Glu Ser Leu Ser Arg Asp Glu Ile Ala Asn Asp Arg Phe Glu
      290          295          300

```

Lys Phe Arg Asn Ile Gly Ser Tyr Ile Glu
305 310

<210> 75

<211> 945

<212> DNA

<213> Staphylococcus aureus

<400> 75

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atgttagatt ttgaaaaacc actttttgaa attcgaaata aaattgaatc tttaaaagaa 60
tctcaagata aaaatgatgt ggattttacaa gaagaaattg acatgcttga agcgtcattg 120
gaacgagaaa ctaaaaaaat atatacaaat ctaaaacat gggatcgtgt gcaaattgcg 180
cgtttgcaag aaagacctac gaccctagat tatattccat atatctttga ttcgtttatg 240
gaactacatg gtgatcgtaa ttttagagat gatccagtaa tgattgggtgg tattggcttt 300
ttaaattggtc gtgctgttac agttattgga caacaacgtg gaaaagatac aaaagataat 360
atztatcgaa attttggtat ggcgcaccca gaaggttacc gaaaagcatt acgttttaatg 420
aaacaagctg aaaaattcaa tcgtcctatc tttacattta tagatacaaa aggtgcatat 480
cctggtaaa gctgctgaaga acgtggacaa agtgaatcta tcgcaacaaa tttgattgag 540
atggcttcat taaaagtacc agttattgag attgtcattg gtgaagggtg cagtggaggt 600
gctctaggtt ttggtattgc caataaagta ttgatgttag agaatagtag ttactctgtt 660
atatctcctg aagggtgcagc ggcattatta tggaaagaca gtaatttggc taaaattgca 720
gctgaaacaa tgaaaattac tgcccatgat attaagcaat taggtattat agatgatgtc 780
atctctgaac cacttggcgg tgcacataaa gatattgaac agcaagcttt agctattaaa 840
tcagcgtttg ttgcacagtt agattcactt gagtcattat cacgtgatga aattgctaatt 900
gatcgctttg aaaaattcag aaatatcggt tcttatatag aataa 945

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<210> 76

<211> 314

<212> PRT

<213> Staphylococcus aureus

<400> 76

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Met Leu Asp Phe Glu Lys Pro Leu Phe Glu Ile Arg Asn Lys Ile Glu
 1          5          10         15

Ser Leu Lys Glu Ser Gln Asp Lys Asn Asp Val Asp Leu Gln Glu Glu
          20          25         30

Ile Asp Met Leu Glu Ala Ser Leu Glu Arg Glu Thr Lys Lys Ile Tyr
          35          40         45

Thr Asn Leu Lys Pro Trp Asp Arg Val Gln Ile Ala Arg Leu Gln Glu
          50          55         60

Arg Pro Thr Thr Leu Asp Tyr Ile Pro Tyr Ile Phe Asp Ser Phe Met
          65          70         75         80

Glu Leu His Gly Asp Arg Asn Phe Arg Asp Asp Pro Val Met Ile Gly
          85          90         95

Gly Ile Gly Phe Leu Asn Gly Arg Ala Val Thr Val Ile Gly Gln Gln
          100         105        110

Arg Gly Lys Asp Thr Lys Asp Asn Ile Tyr Arg Asn Phe Gly Met Ala
          115         120        125

```

His Pro Glu Gly Tyr Arg Lys Ala Leu Arg Leu Met Lys Gln Ala Glu
 130 135 140
 Lys Phe Asn Arg Pro Ile Phe Thr Phe Ile Asp Thr Lys Gly Ala Tyr
 145 150 155 160
 Pro Gly Lys Ala Ala Glu Glu Arg Gly Gln Ser Glu Ser Ile Ala Thr
 165 170 175
 Asn Leu Ile Glu Met Ala Ser Leu Lys Val Pro Val Ile Ala Ile Val
 180 185 190
 Ile Gly Glu Gly Gly Ser Gly Gly Ala Leu Gly Ile Gly Ile Ala Asn
 195 200 205
 Lys Val Leu Met Leu Glu Asn Ser Thr Tyr Ser Val Ile Ser Pro Glu
 210 215 220
 Gly Ala Ala Ala Leu Leu Trp Lys Asp Ser Asn Leu Ala Lys Ile Ala
 225 230 235 240
 Ala Glu Thr Met Lys Ile Thr Ala His Asp Ile Lys Gln Leu Gly Ile
 245 250 255
 Ile Asp Asp Val Ile Ser Glu Pro Leu Gly Gly Ala His Lys Asp Ile
 260 265 270
 Glu Gln Gln Ala Leu Ala Ile Lys Ser Ala Phe Val Ala Gln Leu Asp
 275 280 285
 Ser Leu Glu Ser Leu Ser Arg Asp Glu Ile Ala Asn Asp Arg Phe Glu
 290 295 300
 Lys Phe Arg Asn Ile Gly Ser Tyr Ile Glu
 305 310

<210> 77
 <211> 40
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 77
 gcggcggccc atatgtaga ttttgaaaaa ccactttttg

40

<210> 78
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 78
gcgcgggatcc accatgtagt tccataaacg aatc

34

<210> 79
<211> 15
<212> PRT
<213> Staphylococcus aureus

<400> 79
Met Ala Ser Leu Lys Val Pro Val Ile Ala Ile Val Ile Gly Glu
1 5 10 15

<210> 80
<211> 20
<212> PRT
<213> Staphylococcus aureus

<400> 80
Gln Gln Ala Leu Ala Ile Lys Ser Ala Phe Val Ala Gln Leu Asp Ser
1 5 10 15

Leu Glu Ser Leu
20

<210> 81
<211> 10
<212> PRT
<213> Staphylococcus aureus

<400> 81
Thr Leu Asp Tyr Ile Pro Tyr Ile Phe Asp
1 5 10

<210> 82
<211> 1356
<212> DNA
<213> Staphylococcus aureus

<400> 82
atgggaaaaat attttggtac agacggagta agaggtgtcg caaaccaaga actaacacct 60
gaattggcat tttaaattagg aagatacggg ggctatgttc tagcacataa taaaggtgaa 120
aaacacccac gtgtacttgt aggtcgcgat actagagttt caggtgaaat gttagaatca 180
gcattaatag ctgggttgat ttcaattggg gcagaagtga tgcgattagg tattatttca 240
acaccagggtg ttgcatattt aacacgcgat atgggtgcag agttagggtg aatgatttca 300
gcctctcata atccagttgc agataatggg attaaattct ttggatcaga tggttttaaa 360
ctatcagatg aacaagaaaa tgaaattgaa gcattattgg atcaagaaaa cccagaatta 420
ccaagaccag ttggcaatga tattgtacat tattcagatt actttgaagg ggcacaaaaa 480
tatttgagct atttaaaatc aacagtagat gttaactttg aaggtttgaa aattgcttta 540
gatggtgcaa atggttcaac atcatcacta gcgccattct tatttgggtga cttagaagca 600
gatactgaaa caattggatg tagtcctgat ggatataata tcaatgagaa atgtggctct 660
acacatcctg aaaaattagc tgaaaaagta gttgaaactg aaagtgattt tgggttagca 720
tttgacggcg atggagacag aatcatagca gtagatgaga atgggtcaaat cgttgacggg 780
gaccaaatta tgtttattat tgggtcaagaa atgcataaaa atcaagaatt gaataatgac 840

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atgattgttt ctactgttat gagtaattta gggtttttaca aagcgcttga acaagaagga 900
attaaatcta ataaaactaa agttggcgac agatatgtag tagaagaaat gcgtcgcggt 960
aattataact taggtggaga acaatctgga catatcggtta tgatggatta caatacaact 1020
ggtgatggtt tattaactgg tattcaatta gcttctgtaa taaaaatgac tggtaaataca 1080
ctaagtgaat tagctggaca aatgaaaaaa tatccacaat cattaattaa cgtagcgcgt 1140
acagataaat atcgtgttga agaaaatggt gacgttaaag aagttatgac taaagtagaa 1200
gtagaaatga atggagaagg tcgaatttta gtaagacctt ctggaacaga accattagtt 1260
cgtgtcatgg ttgaagcagc aactgatgaa gatgctgaaa gatttgcaca acaaatagct 1320
gatgtggttc aagataaaat gggattagat aaataa 1356

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<210> 83

<211> 451

<212> PRT

<213> Staphylococcus aureus

<400> 83

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Met Gly Lys Tyr Phe Gly Thr Asp Gly Val Arg Gly Val Ala Asn Gln
  1           5           10           15

Glu Leu Thr Pro Glu Leu Ala Phe Lys Leu Gly Arg Tyr Gly Gly Tyr
      20           25           30

Val Leu Ala His Asn Lys Gly Glu Lys His Pro Arg Val Leu Val Gly
      35           40           45

Arg Asp Thr Arg Val Ser Gly Glu Met Leu Glu Ser Ala Leu Ile Ala
      50           55           60

Gly Leu Ile Ser Ile Gly Ala Glu Val Met Arg Leu Gly Ile Ile Ser
      65           70           75           80

Thr Pro Gly Val Ala Tyr Leu Thr Arg Asp Met Gly Ala Glu Leu Gly
      85           90           95

Val Met Ile Ser Ala Ser His Asn Pro Val Ala Asp Asn Gly Ile Lys
      100          105          110

Phe Phe Gly Ser Asp Gly Phe Lys Leu Ser Asp Glu Gln Glu Asn Glu
      115          120          125

Ile Glu Ala Leu Leu Asp Gln Glu Asn Pro Glu Leu Pro Arg Pro Val
      130          135          140

Gly Asn Asp Ile Val His Tyr Ser Asp Tyr Phe Glu Gly Ala Gln Lys
      145          150          155          160

Tyr Leu Ser Tyr Leu Lys Ser Thr Val Asp Val Asn Phe Glu Gly Leu
      165          170          175

Lys Ile Ala Leu Asp Gly Ala Asn Gly Ser Thr Ser Ser Leu Ala Pro
      180          185          190

Phe Leu Phe Gly Asp Leu Glu Ala Asp Thr Glu Thr Ile Gly Cys Ser
      195          200          205

Pro Asp Gly Tyr Asn Ile Asn Glu Lys Cys Gly Ser Thr His Pro Glu
      210          215          220

```

Lys Leu Ala Glu Lys Val Val Glu Thr Glu Ser Asp Phe Gly Leu Ala
 225 230 235 240
 Phe Asp Gly Asp Gly Asp Arg Ile Ile Ala Val Asp Glu Asn Gly Gln
 245 250 255
 Ile Val Asp Gly Asp Gln Ile Met Phe Ile Ile Gly Gln Glu Met His
 260 265 270
 Lys Asn Gln Glu Leu Asn Asn Asp Met Ile Val Ser Thr Val Met Ser
 275 280 285
 Asn Leu Gly Phe Tyr Lys Ala Leu Glu Gln Glu Gly Ile Lys Ser Asn
 290 295 300
 Lys Thr Lys Val Gly Asp Arg Tyr Val Val Glu Glu Met Arg Arg Gly
 305 310 315 320
 Asn Tyr Asn Leu Gly Gly Glu Gln Ser Gly His Ile Val Met Met Asp
 325 330 335
 Tyr Asn Thr Thr Gly Asp Gly Leu Leu Thr Gly Ile Gln Leu Ala Ser
 340 345 350
 Val Ile Lys Met Thr Gly Lys Ser Leu Ser Glu Leu Ala Gly Gln Met
 355 360 365
 Lys Lys Tyr Pro Gln Ser Leu Ile Asn Val Arg Val Thr Asp Lys Tyr
 370 375 380
 Arg Val Glu Glu Asn Val Asp Val Lys Glu Val Met Thr Lys Val Glu
 385 390 395 400
 Val Glu Met Asn Gly Glu Gly Arg Ile Leu Val Arg Pro Ser Gly Thr
 405 410 415
 Glu Pro Leu Val Arg Val Met Val Glu Ala Ala Thr Asp Glu Asp Ala
 420 425 430
 Glu Arg Phe Ala Gln Gln Ile Ala Asp Val Val Gln Asp Lys Met Gly
 435 440 445
 Leu Asp Lys
 450

<210> 84

<211> 1356

<212> DNA

<213> Staphylococcus aureus

<400> 84

atgggaaaat attttggtac agacggagta agaggtgtcg caaaccaaga actaacacct 60
 gaattggcat ttaaattagg aagatacggg ggctatgttc tagcacataa taaagggtgaa 120
 aacacccac gtgtacttgt aggtcgcgat actagagttt caggtgaaat gttagaatca 180
 gcattaatag ctggtttgat ttcaattggg gcagaagtga tgcgattagg tattatttca 240
 acaccaggtg ttgcatatth aacacgcgat atgggtgcag agttaggtgt aatgatttca 300

```

gcctctcata atccagttgc agataatggg attaaattct ttggatcaga tgggttttaa 360
ctatcagatg aacaagaaaa tgaaattgaa gcattattgg atcaagaaaa ccagaaatta 420
ccaagaccag ttggcaatga tattgtacat tattcagatt actttgaagg ggcacaaaaa 480
tatttgagct atttaaaatc aacagtagat gttaactttg aagggttgaa aattgcttta 540
gatggtgcaa atggttcaac atcatcacta gcgccattct tatttgggtga cttagaagca 600
gatactgaaa caattggatg tagtcctgat ggatataata tcaatgagaa atgtggctct 660
acacatcctg aaaaattagc tgaaaaagta gttgaaactg aaagtgattt tgggttagca 720
tttgacggcg atggagacag aatcatagca gtagatgaga atgggtcaa atcggtgacggt 780
gaccaaatta tggtttattat tgggtcaagaa atgcataaaa atcaagaatt gaataatgac 840
atgattgttt ctactgttat gagtaattta ggtttttaca aagcgcttga acaagaagga 900
attaaatcta ataaaactaa agttggcgac agatatgtag tagaagaaat gcgtcgcggt 960
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ggtgatgggt tattaactgg tattcaatta gcttctgtaa taaaaatgac tggtaaata 1080
ctaagtgaat tagctggaca aatgaaaaaa tatccacaat cattaattaa cgtacgcgta 1140
acagataaat atcgtgttga agaaaatgtt gacgttaaag aagttatgac taaagtagaa 1200
gtagaaatga atggagaagg tcgaatttta gtaagacctt ctggaacaga accattagtt 1260
cgtgtcatgg ttgaagcagc aactgatgaa gatgctgaaa gatttgcaca acaaatagct 1320
gatgtggttc aagataaaat gggattagat aaataa 1356

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<210> 85

<211> 451

<212> PRT

<213> Staphylococcus aureus

<400> 85

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Met Gly Lys Tyr Phe Gly Thr Asp Gly Val Arg Gly Val Ala Asn Gln
 1             5             10             15

Glu Leu Thr Pro Glu Leu Ala Phe Lys Leu Gly Arg Tyr Gly Gly Tyr
      20             25             30

Val Leu Ala His Asn Lys Gly Glu Lys His Pro Arg Val Leu Val Gly
      35             40             45

Arg Asp Thr Arg Val Ser Gly Glu Met Leu Glu Ser Ala Leu Ile Ala
      50             55             60

Gly Leu Ile Ser Ile Gly Ala Glu Val Met Arg Leu Gly Ile Ile Ser
      65             70             75             80

Thr Pro Gly Val Ala Tyr Leu Thr Arg Asp Met Gly Ala Glu Leu Gly
      85             90             95

Val Met Ile Ser Ala Ser His Asn Pro Val Ala Asp Asn Gly Ile Lys
      100            105            110

Phe Phe Gly Ser Asp Gly Phe Lys Leu Ser Asp Glu Gln Glu Asn Glu
      115            120            125

Ile Glu Ala Leu Leu Asp Gln Glu Asn Pro Glu Leu Pro Arg Pro Val
      130            135            140

Gly Asn Asp Ile Val His Tyr Ser Asp Tyr Phe Glu Gly Ala Gln Lys
      145            150            155            160

Tyr Leu Ser Tyr Leu Lys Ser Thr Val Asp Val Asn Phe Glu Gly Leu
      165            170            175

```


Lys Ile Ala Leu Asp Gly Ala Asn Gly Ser Thr Ser Ser Leu Ala Pro
 180 185 190
 Phe Leu Phe Gly Asp Leu Glu Ala Asp Thr Glu Thr Ile Gly Cys Ser
 195 200 205
 Pro Asp Gly Tyr Asn Ile Asn Glu Lys Cys Gly Ser Thr His Pro Glu
 210 215 220
 Lys Leu Ala Glu Lys Val Val Glu Thr Glu Ser Asp Phe Gly Leu Ala
 225 230 235 240
 Phe Asp Gly Asp Gly Asp Arg Ile Ile Ala Val Asp Glu Asn Gly Gln
 245 250 255
 Ile Val Asp Gly Asp Gln Ile Met Phe Ile Ile Gly Gln Glu Met His
 260 265 270
 Lys Asn Gln Glu Leu Asn Asn Asp Met Ile Val Ser Thr Val Met Ser
 275 280 285
 Asn Leu Gly Phe Tyr Lys Ala Leu Glu Gln Glu Gly Ile Lys Ser Asn
 290 295 300
 Lys Thr Lys Val Gly Asp Arg Tyr Val Val Glu Glu Met Arg Arg Gly
 305 310 315 320
 Asn Tyr Asn Leu Gly Gly Glu Gln Ser Gly His Ile Val Met Met Asp
 325 330 335
 Tyr Asn Thr Thr Gly Asp Gly Leu Leu Thr Gly Ile Gln Leu Ala Ser
 340 345 350
 Val Ile Lys Met Thr Gly Lys Ser Leu Ser Glu Leu Ala Gly Gln Met
 355 360 365
 Lys Lys Tyr Pro Gln Ser Leu Ile Asn Val Arg Val Thr Asp Lys Tyr
 370 375 380
 Arg Val Glu Glu Asn Val Asp Val Lys Glu Val Met Thr Lys Val Glu
 385 390 395 400
 Val Glu Met Asn Gly Glu Gly Arg Ile Leu Val Arg Pro Ser Gly Thr
 405 410 415
 Glu Pro Leu Val Arg Val Met Val Glu Ala Ala Thr Asp Glu Asp Ala
 420 425 430
 Glu Arg Phe Ala Gln Gln Ile Ala Asp Val Val Gln Asp Lys Met Gly
 435 440 445
 Leu Asp Lys
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<210> 86
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 86
 gcggcggccc atatgggaaa atattttggt acag 34

<210> 87
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 87
 gcgcggatcc aacacctggt gttgaaataa tac 33

<210> 88
 <211> 10
 <212> PRT
 <213> Staphylococcus aureus

<400> 88
 Thr Glu Pro Leu Val Arg Val Met Val Glu
 1 5 10

<210> 89
 <211> 12
 <212> PRT
 <213> Staphylococcus aureus

<400> 89
 Leu Thr Gly Ile Gln Leu Ala Ser Val Ile Lys Met
 1 5 10

<210> 90
 <211> 9
 <212> PRT
 <213> Staphylococcus aureus

<400> 90
 His Pro Arg Val Leu Val Gly Arg Asp
 1 5

<210> 91
 <211> 1044
 <212> DNA
 <213> Streptococcus pneumoniae

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<400> 91
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ctttcagctg agagtgtcat gcgtgcggtc gattacgacc gtttcacagt caagactttc 120
tttatcagtc agtcagggtga ctttatcaaa acacaggaat ttagtcatgc tccggggcaa 180
gaagaccgtc tcatgaccaa tgaaaccatt gattgggata agaaagttgc accaagtgtc 240
atctacgaag aaggtgcagt ggtctttcca gtccttcacg ggccaatggg agaagatggc 300
tctgttcaag gattcttgga agttttgaaa atgccttacg ttggttgcaa cattttgtca 360
tcaagtcttg ccatggataa aatcacgact aagcgtgttc tggaatctgc tggatttgcc 420
caagttcctt atgtggctat cgttgaaggc gatgatgtga ctgctaaaat cgctgaagtg 480
gaagaaaaat tggcttatcc agtcttcact aagccgtcaa acatgggggtc tagtgctcgg 540
atttctaagt ctgaaaacca agaagaactc cgtcaagcct taaaacttgc cttccgatat 600
gacagccgtg tcttggttga gcaaggagtg aatgccgtg aaattgaggt tggcctcttg 660
ggtaactacg atgtcaagag cacgctacca ggagaagttg tcaaggacgt tgccttttat 720
gactacgatg ccaagtatat tgataacaat attactatgg atattcctgc caaaatcagt 780
gatgatgtgg tggctgtcat gcgtcaaaat gcagaaacag ccttccgtgc cattgggtggc 840
cttgggtctat ctggttgcca tttcttctat acagataagg gagagatttt tctcaacgag 900
ctcaatacta tgccagggtt caccagtggt tctatgtacc cactactttg ggacaatatg 960
gggatcagct acccaaaact aatcgagcgt ttggttgacc ttgccaagga aagttttgac 1020
aagcgcgaag cgcatttgat ataa                                     1044

```

<210> 92
 <211> 347
 <212> PRT
 <213> Streptococcus pneumoniae

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<400> 92
Met Lys Gln Thr Ile Ile Leu Leu Tyr Gly Gly Arg Ser Ala Glu Arg
  1               5               10               15

Glu Val Ser Val Leu Ser Ala Glu Ser Val Met Arg Ala Val Asp Tyr
          20               25               30

Asp Arg Phe Thr Val Lys Thr Phe Phe Ile Ser Gln Ser Gly Asp Phe
      35               40               45

Ile Lys Thr Gln Glu Phe Ser His Ala Pro Gly Gln Glu Asp Arg Leu
  50               55               60

Met Thr Asn Glu Thr Ile Asp Trp Asp Lys Lys Val Ala Pro Ser Ala
  65               70               75               80

Ile Tyr Glu Glu Gly Ala Val Val Phe Pro Val Leu His Gly Pro Met
          85               90               95

Gly Glu Asp Gly Ser Val Gln Gly Phe Leu Glu Val Leu Lys Met Pro
      100               105               110

Tyr Val Gly Cys Asn Ile Leu Ser Ser Ser Leu Ala Met Asp Lys Ile
      115               120               125

Thr Thr Lys Arg Val Leu Glu Ser Ala Gly Ile Ala Gln Val Pro Tyr
      130               135               140

```

Val Ala Ile Val Glu Gly Asp Asp Val Thr Ala Lys Ile Ala Glu Val
 145 150 155 160
 Glu Glu Lys Leu Ala Tyr Pro Val Phe Thr Lys Pro Ser Asn Met Gly
 165 170 175
 Ser Ser Val Gly Ile Ser Lys Ser Glu Asn Gln Glu Glu Leu Arg Gln
 180 185 190
 Ala Leu Lys Leu Ala Phe Arg Tyr Asp Ser Arg Val Leu Val Glu Gln
 195 200 205
 Gly Val Asn Ala Arg Glu Ile Glu Val Gly Leu Leu Gly Asn Tyr Asp
 210 215 220
 Val Lys Ser Thr Leu Pro Gly Glu Val Val Lys Asp Val Ala Phe Tyr
 225 230 235 240
 Asp Tyr Asp Ala Lys Tyr Ile Asp Asn Asn Ile Thr Met Asp Ile Pro
 245 250 255
 Ala Lys Ile Ser Asp Asp Val Val Ala Val Met Arg Gln Asn Ala Glu
 260 265 270
 Thr Ala Phe Arg Ala Ile Gly Gly Leu Gly Leu Ser Arg Cys Asp Phe
 275 280 285
 Phe Tyr Thr Asp Lys Gly Glu Ile Phe Leu Asn Glu Leu Asn Thr Met
 290 295 300
 Pro Gly Phe Thr Gln Trp Ser Met Tyr Pro Leu Leu Trp Asp Asn Met
 305 310 315 320
 Gly Ile Ser Tyr Pro Lys Leu Ile Glu Arg Leu Val Asp Leu Ala Lys
 325 330 335
 Glu Ser Phe Asp Lys Arg Glu Ala His Leu Ile
 340 345

<210> 93

<211> 1044

<212> DNA

<213> Streptococcus pneumoniae

<400> 93

atgaaacaaa cgattattct tttatatggt ggacggagtg cggaacgcga agtctctgtc 60
 ctttcagctg agagtgtcat gcgtgcggtc aattacgacc gtttcacagt caagactttc 120
 tttatcagtc agtcaggtga ctttatcaaa acacaggaat ttagtcatgc tccggggcaa 180
 gaagaccgtc tcatgaccaa tgaaaccatt gattgggata agaaagttgc accaagtgtc 240
 atctacgaag aaggtgcagt ggtctttcca gtccttcacg ggccaatggg agaagatggc 300
 tctgttcaag gattcttgga agttttgaaa atgccttacg ttggttgcaa cattttgtca 360
 tcaagtcttg ccatggataa aatcacgact aagcgtgttc tggaaatctgc tggatttgcc 420
 caagttcctt atgtggctat cggtgaaggc gatgatgtga ctgctaaaat cgctgaagtg 480
 gaagaaaaat tggcttatcc agtcttcatt aagccgtcaa acatgggggc tagtgtcggg 540
 atttctaagt ctgaaaacca agaagaactc cgtcaagcct taaaacttgc cttccgatat 600
 gacagccgtg tcttggttga gcaaggagtg aatgcccggt aaattgaggt tggcctcttg 660

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ggtaactacg atgtcaagag cacgctacct ggagaagttg tcaaggacgt tgccttttat 720
gactacgatg ccaagtatat tgataacaag attactatgg atattcctac caaaatcagt 780
gatgatgtgg tggctgtcat gcgtcaaaat gcagaaacag ccttccgtgc cattggtggc 840
cttggtctat ctcggtgcga tttcttctat acagataagg gagagatttt tctcaacgag 900
ctcaatacca tgccagggtt caccagtggt tctatgtacc cactactttg ggacaatatg 960
gggatcagct acccagaact aatcgagcgt ttggttgacc ttgccaagga aagttttgac 1020
aagcgcgaa ggcatttgat ataa 1044

```

<210> 94

<211> 347

<212> PRT

<213> Streptococcus pneumoniae

<400> 94

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Met Lys Gln Thr Ile Ile Leu Leu Tyr Gly Gly Arg Ser Ala Glu Arg
  1             5             10             15

Glu Val Ser Val Leu Ser Ala Glu Ser Val Met Arg Ala Val Asn Tyr
             20             25             30

Asp Arg Phe Thr Val Lys Thr Phe Phe Ile Ser Gln Ser Gly Asp Phe
             35             40             45

Ile Lys Thr Gln Glu Phe Ser His Ala Pro Gly Gln Glu Asp Arg Leu
             50             55             60

Met Thr Asn Glu Thr Ile Asp Trp Asp Lys Lys Val Ala Pro Ser Ala
             65             70             75             80

Ile Tyr Glu Glu Gly Ala Val Val Phe Pro Val Leu His Gly Pro Met
             85             90             95

Gly Glu Asp Gly Ser Val Gln Gly Phe Leu Glu Val Leu Lys Met Pro
            100            105            110

Tyr Val Gly Cys Asn Ile Leu Ser Ser Ser Leu Ala Met Asp Lys Ile
            115            120            125

Thr Thr Lys Arg Val Leu Glu Ser Ala Gly Ile Ala Gln Val Pro Tyr
            130            135            140

Val Ala Ile Val Glu Gly Asp Asp Val Thr Ala Lys Ile Ala Glu Val
            145            150            155            160

Glu Glu Lys Leu Ala Tyr Pro Val Phe Ile Lys Pro Ser Asn Met Gly
            165            170            175

Ser Ser Val Gly Ile Ser Lys Ser Glu Asn Gln Glu Glu Leu Arg Gln
            180            185            190

Ala Leu Lys Leu Ala Phe Arg Tyr Asp Ser Arg Val Leu Val Glu Gln
            195            200            205

Gly Val Asn Ala Arg Glu Ile Glu Val Gly Leu Leu Gly Asn Tyr Asp
            210            215            220

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Val Lys Ser Thr Leu Pro Gly Glu Val Val Lys Asp Val Ala Phe Tyr
 225 230 235 240
 Asp Tyr Asp Ala Lys Tyr Ile Asp Asn Lys Ile Thr Met Asp Ile Pro
 245 250 255
 Thr Lys Ile Ser Asp Asp Val Val Ala Val Met Arg Gln Asn Ala Glu
 260 265 270
 Thr Ala Phe Arg Ala Ile Gly Gly Leu Gly Leu Ser Arg Cys Asp Phe
 275 280 285
 Phe Tyr Thr Asp Lys Gly Glu Ile Phe Leu Asn Glu Leu Asn Thr Met
 290 295 300
 Pro Gly Phe Thr Gln Trp Ser Met Tyr Pro Leu Leu Trp Asp Asn Met
 305 310 315 320
 Gly Ile Ser Tyr Pro Glu Leu Ile Glu Arg Leu Val Asp Leu Ala Lys
 325 330 335
 Glu Ser Phe Asp Lys Arg Glu Ala His Leu Ile
 340 345

<210> 95

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 95

gcggcgcccc atatgaaaca aacgattatt cttttatatg

40

<210> 96

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 96

gcgcggatcc tatcaaatgc gcttcgcgc

29

<210> 97

<211> 12

<212> PRT

<213> Streptococcus pneumoniae

<400> 97

Glu Glu Gly Ala Val Val Phe Pro Val Leu His Gly
 1 5 10

<210> 98

<211> 22

<212> PRT

<213> Streptococcus pneumoniae

<400> 98

Thr Lys Arg Val Leu Glu Ser Ala Gly Ile Ala Gln Val Pro Tyr Val
 1 5 10 15

Ala Ile Val Glu Gly Asp
 20

<210> 99

<211> 9

<212> PRT

<213> Streptococcus pneumoniae

<400> 99

Asp Ser Arg Val Leu Val Glu Gln Gly
 1 5

<210> 100

<211> 1353

<212> DNA

<213> Streptococcus pneumoniae

<400> 100

| | | | | | | |
|-------------|------------|-------------|------------|------------|------------|------|
| atgggtaaat | attttgggac | tgatggagtc | cgtggagaag | ctaacctaga | actaacacca | 60 |
| gaattagcct | ttaaactagg | acgtttttgga | ggctatgttc | ttagtcaaca | tgaaacggaa | 120 |
| gcgccgaaag | tctttgtagg | acgtgacaca | cgtatttcag | gggaaatgtt | ggaatcggcc | 180 |
| ttggtggcag | gtctcctttc | agtagggatt | cacgtataca | aacttggtgt | ccttgcaaca | 240 |
| ccagcagtag | cttacttggt | tgaaactgaa | ggagcaagtg | cgggtgtcat | gatttctgct | 300 |
| agccacaacc | cagcccttga | taacggaatc | aagttctttg | gcggtgatgg | cttcaaacta | 360 |
| gatgatgaaa | aagaagcaga | aattgaagcc | ttgctagatg | ctgaggaaga | cactcttcct | 420 |
| cgtccaagtg | cagaaggctt | aggaattttg | gtagattatc | cagaaggctt | gcgtaagtat | 480 |
| gaaggatacc | ttgtttcaac | tggaaactcct | cttgatggaa | tgaaggttgc | cttggataca | 540 |
| gctaattggag | cagcttctac | cagtgcccg | caaactcttg | cagaccttgg | tgcccaattg | 600 |
| acggttatcg | gggaaacacc | agacggtctt | aacatcaacc | ttaatgttgg | ttcaacacat | 660 |
| ccagaagccc | ttcaagaagt | ggtcaaagaa | agtgggtcag | ctattgggtt | ggcctttgat | 720 |
| ggagacagtg | accgcttgat | tgctgttgat | gagaatggtg | acatcgttga | tggtgacaag | 780 |
| attatgtaca | tcatcgga | atacctttct | gaaaaaggac | aattgggtca | aaatacaatt | 840 |
| gtgacaactg | ttatgtctaa | ccttggtttc | cacaaggcct | tgaatcgcca | aggtattaac | 900 |
| aaggcagtta | ctgcagttgg | tgaccgctac | gttggtgaag | aaatgagaaa | atcaggctac | 960 |
| aaccttggtg | gtgaacagtc | tggtcacgtt | atcttgatgg | attacaatac | cacaggtgat | 1020 |
| ggtcaattat | cagcagttca | attgactaaa | atcatgaagg | aaactggtaa | gagcttatca | 1080 |
| gagttggcgg | cagaagtaac | gatttatcca | caaaaattag | ttaatatccg | agtggaaaac | 1140 |
| gtcatgaagg | aaaaggccat | ggaagtgcc | gctatcaagg | ccatcatcga | gaagatggaa | 1200 |
| gaagaaatgg | cggggaacgg | ccgtatcctt | gttcgtccaa | gtggaacaga | acccctcttg | 1260 |
| cgtgttatgg | cagaagcgcc | tacaacagaa | gaagtaaact | actatgttga | taccatcaca | 1320 |
| gatgtagttc | gtgctgaaat | tgggattgac | taa | | | 1353 |

<210> 101

<211> 450

<212> PRT

<213> Streptococcus pneumoniae

<400> 101

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Met Gly Lys Tyr Phe Gly Thr Asp Gly Val Arg Gly Glu Ala Asn Leu
  1           5           10           15

Glu Leu Thr Pro Glu Leu Ala Phe Lys Leu Gly Arg Phe Gly Gly Tyr
      20           25           30

Val Leu Ser Gln His Glu Thr Glu Ala Pro Lys Val Phe Val Gly Arg
      35           40           45

Asp Thr Arg Ile Ser Gly Glu Met Leu Glu Ser Ala Leu Val Ala Gly
      50           55           60

Leu Leu Ser Val Gly Ile His Val Tyr Lys Leu Gly Val Leu Ala Thr
      65           70           75           80

Pro Ala Val Ala Tyr Leu Val Glu Thr Glu Gly Ala Ser Ala Gly Val
      85           90           95

Met Ile Ser Ala Ser His Asn Pro Ala Leu Asp Asn Gly Ile Lys Phe
      100          105          110

Phe Gly Gly Asp Gly Phe Lys Leu Asp Asp Glu Lys Glu Ala Glu Ile
      115          120          125

Glu Ala Leu Leu Asp Ala Glu Glu Asp Thr Leu Pro Arg Pro Ser Ala
      130          135          140

Glu Gly Leu Gly Ile Leu Val Asp Tyr Pro Glu Gly Leu Arg Lys Tyr
      145          150          155          160

Glu Gly Tyr Leu Val Ser Thr Gly Thr Pro Leu Asp Gly Met Lys Val
      165          170          175

Ala Leu Asp Thr Ala Asn Gly Ala Ala Ser Thr Ser Ala Arg Gln Ile
      180          185          190

Phe Ala Asp Leu Gly Ala Gln Leu Thr Val Ile Gly Glu Thr Pro Asp
      195          200          205

Gly Leu Asn Ile Asn Leu Asn Val Gly Ser Thr His Pro Glu Ala Leu
      210          215          220

Gln Glu Val Val Lys Glu Ser Gly Ser Ala Ile Gly Leu Ala Phe Asp
      225          230          235          240

Gly Asp Ser Asp Arg Leu Ile Ala Val Asp Glu Asn Gly Asp Ile Val
      245          250          255

Asp Gly Asp Lys Ile Met Tyr Ile Ile Gly Lys Tyr Leu Ser Glu Lys
      260          265          270

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Gly Gln Leu Ala Gln Asn Thr Ile Val Thr Thr Val Met Ser Asn Leu
 275 280 285
 Gly Phe His Lys Ala Leu Asn Arg Glu Gly Ile Asn Lys Ala Val Thr
 290 295 300
 Ala Val Gly Asp Arg Tyr Val Val Glu Glu Met Arg Lys Ser Gly Tyr
 305 310 315 320
 Asn Leu Gly Gly Glu Gln Ser Gly His Val Ile Leu Met Asp Tyr Asn
 325 330 335
 Thr Thr Gly Asp Gly Gln Leu Ser Ala Val Gln Leu Thr Lys Ile Met
 340 345 350
 Lys Glu Thr Gly Lys Ser Leu Ser Glu Leu Ala Ala Glu Val Thr Ile
 355 360 365
 Tyr Pro Gln Lys Leu Val Asn Ile Arg Val Glu Asn Val Met Lys Glu
 370 375 380
 Lys Ala Met Glu Val Pro Ala Ile Lys Ala Ile Ile Glu Lys Met Glu
 385 390 395 400
 Glu Glu Met Ala Gly Asn Gly Arg Ile Leu Val Arg Pro Ser Gly Thr
 405 410 415
 Glu Pro Leu Leu Arg Val Met Ala Glu Ala Pro Thr Thr Glu Val
 420 425 430
 Asn Tyr Tyr Val Asp Thr Ile Thr Asp Val Val Arg Ala Glu Ile Gly
 435 440 445
 Ile Asp
 450

<210> 102

<211> 1353

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 102

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atgggtaaat attttgggac tgatggagtc cgtggagaag ctaacctaga actaacacca 60
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gcgccgaaag tctttgtagg acgtgacaca cgtatttcag gggaaatgct ggaatcggcc 180
ttggtggcag gtctcctttc agtagggatt cacgtataca aacttggtgt ccttgcaaca 240
tcagcagtag cttacttggt tgaaactgaa ggagcaagtg ccggtgtcat gatttctgct 300
agccacaacc cagcccttga taacggaatc aagttccttg gcggtgatgg cttcaaacta 360
gatgatgaaa aagaagcaga aattgaagcc ttgctagatg ctgaggaaga cactcttcct 420
cggccaagtg cagaagggtt aggaatcttg gtagattatc cagaaggctt gcgtaagtat 480
gaaggatacc ttgtttcaac tggaaactcct cttgatggaa tgaagggttg cttggataca 540
gctaattggag cagcttctac cagtgcccggt caaatctttg cagaccttgg tgcccaattg 600
acggttatcg gggaaacacc agacggtcct aacatcaacc ttaatgttgg ttcaacacat 660
ccagaagccc ttcaagaagt ggtcaaagaa agtgggtcag ctattgggtt ggcctttgat 720
ggagacagtg accgcttgat tgctgttgat gagaatggtg acatcgttga tgggtgacaag 780
attatgtaca tcatcggaaa atacctttct gaaaaaggac aattggctca aaatacaatt 840
gtgacaactg ttatgtctaa ccttgggttc cacaaggcct tgaatcgca aggtattaac 900

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aaggcagtta ctgcagttgg tgaccgctac gttgttgaag aaatgagaaa atcaggctac 960
aaccttggtg gtgaacagtc tggtcacgtt atcttgatgg attacaatac cacagggtgat 1020
ggtcaattat cagcagttca attgactaaa atcatgaagg aaactggtaa gagcttatca 1080
gagttggcgg cagaagtaac gatttatcca caaaaattag ttaatatccg agtggaaaac 1140
gtcatgaagg aaaaggccat ggaagtgcca gctatcaagg ccatcatcga gaagatggaa 1200
gaagaaatgg cggggaacgg ccgtatcctt gttcgtccaa gtggaacaga acccctcttg 1260
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<210> 103

<211> 450

<212> PRT

<213> Streptococcus pneumoniae

<400> 103

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Met Gly Lys Tyr Phe Gly Thr Asp Gly Val Arg Gly Glu Ala Asn Leu
 1             5             10             15

Glu Leu Thr Pro Glu Leu Ala Phe Lys Leu Gly Arg Phe Gly Gly Tyr
      20             25             30

Val Leu Ser Gln His Glu Thr Glu Ala Pro Lys Val Phe Val Gly Arg
      35             40             45

Asp Thr Arg Ile Ser Gly Glu Met Leu Glu Ser Ala Leu Val Ala Gly
      50             55             60

Leu Leu Ser Val Gly Ile His Val Tyr Lys Leu Gly Val Leu Ala Thr
      65             70             75             80

Ser Ala Val Ala Tyr Leu Val Glu Thr Glu Gly Ala Ser Ala Gly Val
      85             90             95

Met Ile Ser Ala Ser His Asn Pro Ala Leu Asp Asn Gly Ile Lys Phe
      100            105            110

Phe Gly Gly Asp Gly Phe Lys Leu Asp Asp Glu Lys Glu Ala Glu Ile
      115            120            125

Glu Ala Leu Leu Asp Ala Glu Glu Asp Thr Leu Pro Arg Pro Ser Ala
      130            135            140

Glu Gly Leu Gly Ile Leu Val Asp Tyr Pro Glu Gly Leu Arg Lys Tyr
      145            150            155            160

Glu Gly Tyr Leu Val Ser Thr Gly Thr Pro Leu Asp Gly Met Lys Val
      165            170            175

Ala Leu Asp Thr Ala Asn Gly Ala Ala Ser Thr Ser Ala Arg Gln Ile
      180            185            190

Phe Ala Asp Leu Gly Ala Gln Leu Thr Val Ile Gly Glu Thr Pro Asp
      195            200            205

Gly Leu Asn Ile Asn Leu Asn Val Gly Ser Thr His Pro Glu Ala Leu
      210            215            220

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Gln Glu Val Val Lys Glu Ser Gly Ser Ala Ile Gly Leu Ala Phe Asp
 225 230 235 240
 Gly Asp Ser Asp Arg Leu Ile Ala Val Asp Glu Asn Gly Asp Ile Val
 245 250 255
 Asp Gly Asp Lys Ile Met Tyr Ile Ile Gly Lys Tyr Leu Ser Glu Lys
 260 265 270
 Gly Gln Leu Ala Gln Asn Thr Ile Val Thr Thr Val Met Ser Asn Leu
 275 280 285
 Gly Phe His Lys Lys Ala Leu Asn Arg Glu Gly Ile Asn Lys Ala Val Thr
 290 295 300
 Ala Val Gly Asp Arg Tyr Val Val Glu Glu Met Arg Lys Ser Gly Tyr
 305 310 315 320
 Asn Leu Gly Gly Glu Gln Ser Gly His Val Ile Leu Met Asp Tyr Asn
 325 330 335
 Thr Thr Gly Asp Gly Gln Leu Ser Ala Val Gln Leu Thr Lys Ile Met
 340 345 350
 Lys Glu Thr Gly Lys Ser Leu Ser Glu Leu Ala Ala Glu Val Thr Ile
 355 360 365
 Tyr Pro Gln Lys Leu Val Asn Ile Arg Val Glu Asn Val Met Lys Glu
 370 375 380
 Lys Ala Met Glu Val Pro Ala Ile Lys Ala Ile Ile Glu Lys Met Glu
 385 390 395 400
 Glu Glu Met Ala Gly Asn Gly Arg Ile Leu Val Arg Pro Ser Gly Thr
 405 410 415
 Glu Pro Leu Leu Arg Val Met Ala Glu Ala Pro Thr Thr Glu Glu Val
 420 425 430
 Asn Tyr Tyr Val Asp Thr Ile Thr Asp Val Val Arg Ala Glu Ile Gly
 435 440 445
 Ile Asp
 450

<210> 104

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 104

gcggcgcccc atatgggtaa atattttggg actg

<210> 105
 <211> 30
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 105
 gcgcgggatcc gtcaatccca atttcagcac 30

<210> 106
 <211> 34
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 106
 gcggcggccc atatgaaata ttttgggact gatg 34

<210> 107
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 107
 gcggcggccc atatgtttgg gactgatgga gtc 33

<210> 108
 <211> 31
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 108
 gcggcggccc atatgactga tggagtccgt g 31

<210> 109
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 109

gcggcggccc atatgggagt ccgtggagaa g 31

<210> 110

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 110

gcggcggccc atatgcgtgg agaagctaac c 31

<210> 111

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 111

gcgcggatcc tgtgatggtg tcaacatagt ag 32

<210> 112

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 112

gcgcggatcc tacatctgtg atggtatcaa c 31

<210> 113

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 113

gcgcggatcc acgaactaca tctgtgatgg 30

<210> 114
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 114
 gcgcggatcc ttcagcacga actacatctg 30

<210> 115
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 115
 gcgcggatcc cccaatttca gcacgaacta c 31

<210> 116
 <211> 32
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 116
 Glu Ser Ala Leu Val Ala Gly Leu Leu Ser Val Gly Ile His Val Tyr
 1 5 10 15
 Lys Leu Gly Val Leu Ala Thr Pro Ala Val Ala Tyr Leu Val Glu Thr
 20 25 30

<210> 117
 <211> 8
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 117
 Leu Ser Ala Val Gln Leu Thr Lys
 1 5

<210> 118
 <211> 22
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 118

Leu Ser Glu Leu Ala Ala Glu Val Thr Ile Tyr Pro Gln Lys Leu Val
 1 5 10 15

Asn Ile Arg Val Glu Asn
 20

<210> 119

<211> 1353

<212> DNA

<213> Streptococcus pneumoniae

<400> 119

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atgaaagtaa tagatcaatt taaaaataag aaagtccttg ttttaggttt ggccaagtct 60
ggtgaatctg cagctcgttt gttggacaag ctaggtgccca ttgtgacagt aaatgatggg 120
aaacctttcg aggacaatcc agctgcccac agtttgctgg aagaagggat caaggtcatt 180
acaggtggcc atcctttgga actcttgat gaagagtttg cccttatggg gaaaaatcca 240
ggtatccctt acaacaatcc catgattgaa aaggctttgg ccaagggaat tccagtcttg 300
actgaggtgg aattggctta ttgatttca gaagcaccga ttattggtat cacaggatcg 360
aacggtaaga caaccacaac gactatgatt ggggaagttt tgactgctgc tggccaacat 420
ggtcttttat cagggaatat cggctatcca gctagtcagg ttgctcaaat agcatcagat 480
aaggacacgc ttgttatgga actttcttct ttccaactca tgggtgttca agaattccat 540
ccagagattg cggttattac caacctcatg ccaactcata tcgactacca tgggtcattt 600
tcggaatatg tagcagccaa gtggaatata cagaacaaga tgacagcagc tgatttcctt 660
gtcttgaact ttaatcaaga cttggcaaaa gacttgactt ccaagacaga agccactgtt 720
gtaccatttt caacacttga aaagggtgat ggagcttatc tggaagatgg tcaactctac 780
ttccgtggtg aagtagtcat ggcagcgaat gaaatcgggtg ttccaggtag ccacaatgtg 840
gaaaatgccc ttgcgactat tgctgtagcc aagcttcgtg atgtggacaa tcaaaccatc 900
aaggaaaactc tttcagcctt cgggtggtgc aaacaccgtc tccagtttgt ggatgacatc 960
aagggtgtta aattctataa cgacagtaaa tcaactaata tcttggctac tcaaaaagcc 1020
ttgtcaggat ttgacaacag caaggctcgtc ttgattgcag gtggtttgga ccgtggcaat 1080
gagtttgacg aattggtgcc agacattact ggactcaaga agatgggtcat cctgggtcaa 1140
tctgcagaac gtgtcaaacg ggcagcagac aaggctggtg tcgcttatgt ggaggcgaca 1200
gatattgcag atgcgacccg caaggcctat gagcttgcca ctcaaggaga tgtggttctt 1260
cttagtcctg ccaatgctag ctgggatatg tatgctaact ttgaagtacg tggcgacctc 1320
tttatcgaca cagtagcgga gttaaaagaa taa 1353

```

<210> 120

<211> 450

<212> PRT

<213> Streptococcus pneumoniae

<400> 120

Met Lys Val Ile Asp Gln Phe Lys Asn Lys Lys Val Leu Val Leu Gly
 1 5 10 15

Leu Ala Lys Ser Gly Glu Ser Ala Ala Arg Leu Leu Asp Lys Leu Gly
 20 25 30

Ala Ile Val Thr Val Asn Asp Gly Lys Pro Phe Glu Asp Asn Pro Ala
 35 40 45

Ala Gln Ser Leu Leu Glu Glu Gly Ile Lys Val Ile Thr Gly Gly His
 50 55 60

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Leu | Glu | Leu | Leu | Asp | Glu | Glu | Phe | Ala | Leu | Met | Val | Lys | Asn | Pro | 65 | 70 | 75 | 80 |
| Gly | Ile | Pro | Tyr | Asn | Asn | Pro | Met | Ile | Glu | Lys | Ala | Leu | Ala | Lys | Gly | 85 | 90 | 95 | |
| Ile | Pro | Val | Leu | Thr | Glu | Val | Glu | Leu | Ala | Tyr | Leu | Ile | Ser | Glu | Ala | 100 | 105 | 110 | |
| Pro | Ile | Ile | Gly | Ile | Thr | Gly | Ser | Asn | Gly | Lys | Thr | Thr | Thr | Thr | Thr | 115 | 120 | 125 | |
| Met | Ile | Gly | Glu | Val | Leu | Thr | Ala | Ala | Gly | Gln | His | Gly | Leu | Leu | Ser | 130 | 135 | 140 | |
| Gly | Asn | Ile | Gly | Tyr | Pro | Ala | Ser | Gln | Val | Ala | Gln | Ile | Ala | Ser | Asp | 145 | 150 | 155 | 160 |
| Lys | Asp | Thr | Leu | Val | Met | Glu | Leu | Ser | Ser | Phe | Gln | Leu | Met | Gly | Val | 165 | 170 | 175 | |
| Gln | Glu | Phe | His | Pro | Glu | Ile | Ala | Val | Ile | Thr | Asn | Leu | Met | Pro | Thr | 180 | 185 | 190 | |
| His | Ile | Asp | Tyr | His | Gly | Ser | Phe | Ser | Glu | Tyr | Val | Ala | Ala | Lys | Trp | 195 | 200 | 205 | |
| Asn | Ile | Gln | Asn | Lys | Met | Thr | Ala | Ala | Asp | Phe | Leu | Val | Leu | Asn | Phe | 210 | 215 | 220 | |
| Asn | Gln | Asp | Leu | Ala | Lys | Asp | Leu | Thr | Ser | Lys | Thr | Glu | Ala | Thr | Val | 225 | 230 | 235 | 240 |
| Val | Pro | Phe | Ser | Thr | Leu | Glu | Lys | Val | Asp | Gly | Ala | Tyr | Leu | Glu | Asp | 245 | 250 | 255 | |
| Gly | Gln | Leu | Tyr | Phe | Arg | Gly | Glu | Val | Val | Met | Ala | Ala | Asn | Glu | Ile | 260 | 265 | 270 | |
| Gly | Val | Pro | Gly | Ser | His | Asn | Val | Glu | Asn | Ala | Leu | Ala | Thr | Ile | Ala | 275 | 280 | 285 | |
| Val | Ala | Lys | Leu | Arg | Asp | Val | Asp | Asn | Gln | Thr | Ile | Lys | Glu | Thr | Leu | 290 | 295 | 300 | |
| Ser | Ala | Phe | Gly | Gly | Val | Lys | His | Arg | Leu | Gln | Phe | Val | Asp | Asp | Ile | 305 | 310 | 315 | 320 |
| Lys | Gly | Val | Lys | Phe | Tyr | Asn | Asp | Ser | Lys | Ser | Thr | Asn | Ile | Leu | Ala | 325 | 330 | 335 | |
| Thr | Gln | Lys | Ala | Leu | Ser | Gly | Phe | Asp | Asn | Ser | Lys | Val | Val | Leu | Ile | 340 | 345 | 350 | |
| Ala | Gly | Gly | Leu | Asp | Arg | Gly | Asn | Glu | Phe | Asp | Glu | Leu | Val | Pro | Asp | 355 | 360 | 365 | |

Ile Thr Gly Leu Lys Lys Met Val Ile Leu Gly Gln Ser Ala Glu Arg
370 375 380

Val Lys Arg Ala Ala Asp Lys Ala Gly Val Ala Tyr Val Glu Ala Thr
385 390 395 400

Asp Ile Ala Asp Ala Thr Arg Lys Ala Tyr Glu Leu Ala Thr Gln Gly
405 410 415

Asp Val Val Leu Leu Ser Pro Ala Asn Ala Ser Trp Asp Met Tyr Ala
420 425 430

Asn Phe Glu Val Arg Gly Asp Leu Phe Ile Asp Thr Val Ala Glu Leu
435 440 445

Lys Glu
450

<210> 121

<211> 1353

<212> DNA

<213> Streptococcus pneumoniae

<400> 121

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atgaaagtaa tagatcaatt taaaaataag aaagtccttg ttttaggttt ggccaagtct 60
ggtgaatctg cagctcgttt gttggacaag ctaggtgcca ttgtgacagt aaatgatggg 120
aagcctttcg aggacaatcc agctgcccaa agtttgctgg aagaagggat caaggtcatt 180
acagggtggcc atccttttga actcttggat gaagagtttg cccttatggg gaaaaatcca 240
ggtatcccct acaacaatcc catgattgaa aaggcttttg ccaaggaat tccagtcttg 300
ctgagggtgg aattggctta tttgatttca gaagcaccga ttattggtat cacaggatcg 360
aacggtgaaga caaccacaac gactatgatt ggggaagttt tgactgctgc tgggcaacat 420
ggtcttttat cagggaatat cggctatcct gccagtcagg ttgctcaaat agcatcagat 480
aaggatacgc ttgttatgga actttcttct tccaactca tgggtgttca agaattccat 540
ccagagattg cggttattac caacctcatg ccaactcata tcgactacca tgggtcattt 600
tcggaatatg tagcagccaa gtggaatc cagaacaaga tgacagcagc tgatttcctt 660
gtcttgaact ttaatcaaga cttggcaaaa gacttgactt ccaagacaga agccactgtt 720
gtaccatttt caacacttga aaaggttgat ggagcttatc tagaagatgg tcaactctac 780
ttcgtgggtg aagtagtcat ggcagcgaat gaaatcgggtg ttccaggtag ccacaatgtg 840
gaaaatgccc ttgcgactat tgctgtagcc aagcttcgtg gtgtggacaa tcaaaccatc 900
aaggaaactc tttcagcctt cgggtggtgc aaacaccgtc tccagtttgt ggatgacatc 960
aagggtgtta aattctataa cgacagtaaa tcaactaata tcttggtac tcaaaaagcc 1020
ttgtcaggat ttgacaacag caaggtcgtc ttgattgcag gtggtttgga ccgtggcaat 1080
gagtttgacg aattggtgcc agatattact ggactcaaga agatggtcat cctgggtcaa 1140
tctgcagaac gtgtcaaacg ggcagcagac aaggctgggtg tcgcttatgt ggaggcgaca 1200
gatattgcag atgcgacccg caaggcatat gagcttgcca ctcaaggaga tgtggttctt 1260
cttagtcctg ccaatgccag ctgggatatg tatgctaact ttgaagtacg tggcgacctc 1320
tttatcgaca cagtagcgga gttaaaagaa taa 1353

```

<210> 122

<211> 450

<212> PRT

<213> Streptococcus pneumoniae

<400> 122

Met Lys Val Ile Asp Gln Phe Lys Asn Lys Lys Val Leu Val Leu Gly
1 5 10 15

| | | | | | | | | | | | | | | | |
|------------|-----|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----|-----------|-----------|-----|------------|
| Leu | Ala | Lys | Ser 20 | Gly | Glu | Ser | Ala | Ala 25 | Arg | Leu | Leu | Asp | Lys 30 | Leu | Gly |
| Ala | Ile | Val 35 | Thr | Val | Asn | Asp | Gly 40 | Lys | Pro | Phe | Glu | Asp 45 | Asn | Pro | Ala |
| Ala | Gln | Ser | Leu | Leu | Glu | Glu | Gly 55 | Ile | Lys | Val | Ile | Thr | Gly | Gly | His |
| Pro 65 | Leu | Glu | Leu | Leu | Asp 70 | Glu | Glu | Phe | Ala | Leu | Met | Val | Lys | Asn | Pro 80 |
| Gly | Ile | Pro | Tyr | Asn 85 | Asn | Pro | Met | Ile | Glu | Lys | Ala | Leu | Ala | Lys | Gly 95 |
| Ile | Pro | Val | Leu 100 | Thr | Glu | Val | Glu | Leu 105 | Ala | Tyr | Leu | Ile | Ser | Glu | Ala |
| Pro | Ile | Ile 115 | Gly | Ile | Thr | Gly | Ser 120 | Asn | Gly | Lys | Thr | Thr | Thr | Thr | Thr |
| Met | Ile | Gly | Glu | Val | Leu | Thr 135 | Ala | Ala | Gly | Gln | His | Gly | Leu | Leu | Ser |
| Gly 145 | Asn | Ile | Gly | Tyr | Pro 150 | Ala | Ser | Gln | Val | Ala | Gln | Ile | Ala | Ser | Asp 160 |
| Lys | Asp | Thr | Leu | Val 165 | Met | Glu | Leu | Ser | Ser 170 | Phe | Gln | Leu | Met | Gly | Val 175 |
| Gln | Glu | Phe | His 180 | Pro | Glu | Ile | Ala | Val 185 | Ile | Thr | Asn | Leu | Met | Pro | Thr |
| His | Ile | Asp 195 | Tyr | His | Gly | Ser | Phe 200 | Ser | Glu | Tyr | Val | Ala | Ala | Lys | Trp |
| Asn | Ile | Gln | Asn | Lys | Met | Thr 215 | Ala | Ala | Asp | Phe | Leu | Val | Leu | Asn | Phe |
| Asn 225 | Gln | Asp | Leu | Ala | Lys 230 | Asp | Leu | Thr | Ser | Lys | Thr | Glu | Ala | Thr | Val 240 |
| Val | Pro | Phe | Ser | Thr 245 | Leu | Glu | Lys | Val | Asp 250 | Gly | Ala | Tyr | Leu | Glu | Asp 255 |
| Gly | Gln | Leu | Tyr 260 | Phe | Arg | Gly | Glu | Val 265 | Val | Met | Ala | Ala | Asn | Glu | Ile |
| Gly | Val | Pro 275 | Gly | Ser | His | Asn | Val 280 | Glu | Asn | Ala | Leu | Ala | Thr | Ile | Ala |
| Val | Ala | Lys | Leu | Arg | Gly | Val 295 | Asp | Asn | Gln | Thr | Ile | Lys | Glu | Thr | Leu |
| Ser 305 | Ala | Phe | Gly | Gly | Val 310 | Lys | His | Arg | Leu | Gln 315 | Phe | Val | Asp | Asp | Ile 320 |

[illegible]

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<210> 123
<211> 42
<212> DNA
<213> Artificial Sequence
```

<220>
<223> Description of Artificial Sequence: Synthetic primer

```
<400> 123
gcggcgcgcc atatgaaagt aatagatcaa tttaaaaata ag 42
```

```
<210> 124
<211> 32
<212> DNA
<213> Artificial Sequence
```

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 124
gcgcggatcc ttcttttaac tccgctactg tg 32

```
<210> 125
<211> 36
<212> DNA
<213> Artificial Sequence
```

<220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 125
 gcggcggccc atatgaaagt ccttgtttta ggtttg 36

 <210> 126
 <211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 126
 gcggcggccc atatgaaaaa taagaaagtc cttgttttag 40

 <210> 127
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 127
 gcggcggccc atatggtttt aggtttggcc aag 33

 <210> 128
 <211> 39
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 128
 gcggcggccc atatggtaat agatcaattt aaaaataag 39

 <210> 129
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 129
gcggcggccc atatggatca atttaaaaat aagaaag 37

<210> 130
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 130
gcggcggccc atatgaataa gaaagtcctt gttttag 37

<210> 131
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 131
gcgcggatcc gaggtcgcca cgtacttc 28

<210> 132
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 132
gcgcggatcc gataaaagagg tcgccacgta c 31

<210> 133
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 133
gcgcggatcc tgtgtcgata aagaggtcgc 30

<210> 134
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 134
 gcgcggatcc cgctactgtg tcgataaaga g 31

<210> 135
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 135
 gcgcggatcc ttttaactcc gctactgtgt c 31

<210> 136
 <211> 10
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 136
 Asn Lys Lys Val Leu Val Leu Gly Leu Ala
 1 5 10

<210> 137
 <211> 10
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 137
 Gln Gly Asp Val Val Leu Leu Ser Pro Ala
 1 5 10

<210> 138
 <211> 8
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 138
 Ser Lys Val Val Leu Ile Ala Gly
 1 5

<210> 139
 <211> 1974
 <212> DNA
 <213> *Staphylococcus aureus*

<400> 139
 atggctaaag aaacatttta tataacaacc ccaatatact atcctagtgg gaatttacat 60
 ataggacatg catattctac agtggctgga gatgttattg caagatataa gagaatgcaa 120
 ggatatgatg ttcgctatth gactggaacg gatgaacacg gtcaaaaaat tcaagaaaaa 180
 gctcaaaaag ctggtaagac agaaattgaa tatttgatg agatgattgc tggaattaaa 240
 caattgtggg ctaagcttga aatttcaaat gatgatttta tcagaacaac tgaagaacgt 300
 cataaacatg tcgttgagca agtgtttgaa cgtttattaa agcaagggtga tatctattta 360
 ggtgaatatg aaggttggta ttctgttccg gatgaaacat actatacaga gtcacaatta 420
 gtagaccac aatacgaaaa cggtaaaatt attggtggca aaagtccaga ttctggacac 480
 gaagttgaac tagttaaaga agaaagttat ttctttaata ttagtaataa tacagaccgt 540
 ttattagagt tctatgacca aaatccagat ttatacaac caccatcaag aaaaaatgaa 600
 atgattaaca acttcattaa accaggactt gctgatttag ctgtttctcg tacatcattt 660
 aactgggggt tccatgttcc gtctaattcca aaacatgttg tttatgtttg gattgatgcy 720
 ttagttaact atatttcagc attaggctat ttatcagatg atgagtcact atttaacaaa 780
 tactggccag cagatattca tttaatggct aaggaaattg tgcgattcca ctcaattatt 840
 tggcctatth tattgatggc attagactta ccgttaccta aaaaagtcct tgcacatggg 900
 tggattttga tgaaagatgg aaaaatgagt aaatctaaag gtaatgtcgt agacccta 960
 attttaattg atcgctatgg tttagatgct acacgttatt atctaagcg tgaattacca 1020
 tttggttcag atggcgtatt tacacctgaa gcatttggtg agcgtacaaa tttcgatcta 1080
 gcaaataact taggtaactt agtaaacgt acgatttcta tggttaataa gtactttgat 1140
 ggcaattac cagcgtatca aggtccactt catgaattag atgaagaaat ggaagctatg 1200
 gctttagaaa cagtgaagag ctacactgaa agcatggaaa gtttgcaatt ttctgtggca 1260
 ttatctacgg tatggaagtt tattagtaga acgaataagt atattgacga aacaacgcct 1320
 tgggtattag ctaaggacga tagccaaaaa gatatgttag gcaatgtaat ggctcactta 1380
 gttgaaaata ttcgttatgc agctgtatta ttacgtccat tcttaacaca tgcgccgaaa 1440
 gagatttttg aacaattgaa cattaacaat cctcaattta tggaaatttag tagtttagag 1500
 caatatgggtg tgcttaatga gtcaattatg gttactgggc aacctaaacc tattttccca 1560
 agattggata gcgaagcgga aattgcatat atcaaagaat caatgcaacc gcctgctact 1620
 aaagaggaaa aagaagagat tcctagcaaa cctcaaattg atattaaaga ctttgataaa 1680
 gttgaaatta aggcagcaac gattattgat gctgaacatg ttaagaagtc agataagctt 1740
 ttaaaaattc aagtagactt agattctgaa caagacaaa ttgtatcagg aattgccaaa 1800
 ttctatacac cagatgatat tattggtaaa aaagtagcag ttgttactaa cctgaaacca 1860
 gctaaattaa tgggacaaaa atctgaaggt atgatattat ctgctgaaaa agatgggtgta 1920
 ttaaccttag taagtttacc aagtgaatt ccaaatgggt cagtgattaa ataa 1974

<210> 140
 <211> 657
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 140
 Met Ala Lys Glu Thr Phe Tyr Ile Thr Thr Pro Ile Tyr Tyr Pro Ser
 1 5 10 15
 Gly Asn Leu His Ile Gly His Ala Tyr Ser Thr Val Ala Gly Asp Val
 20 25 30
 Ile Ala Arg Tyr Lys Arg Met Gln Gly Tyr Asp Val Arg Tyr Leu Thr
 35 40 45
 Gly Thr Asp Glu His Gly Gln Lys Ile Gln Glu Lys Ala Gln Lys Ala
 50 55 60

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Lys | Thr | Glu | Ile | Glu | Tyr | Leu | Asp | Glu | Met | Ile | Ala | Gly | Ile | Lys | 65 | 70 | 75 | 80 |
| Gln | Leu | Trp | Ala | Lys | Leu | Glu | Ile | Ser | Asn | Asp | Asp | Phe | Ile | Arg | Thr | 85 | 90 | 95 | |
| Thr | Glu | Glu | Arg | His | Lys | His | Val | Val | Glu | Gln | Val | Phe | Glu | Arg | Leu | 100 | 105 | 110 | |
| Leu | Lys | Gln | Gly | Asp | Ile | Tyr | Leu | Gly | Glu | Tyr | Glu | Gly | Trp | Tyr | Ser | 115 | 120 | 125 | |
| Val | Pro | Asp | Glu | Thr | Tyr | Tyr | Thr | Glu | Ser | Gln | Leu | Val | Asp | Pro | Gln | 130 | 135 | 140 | |
| Tyr | Glu | Asn | Gly | Lys | Ile | Ile | Gly | Gly | Lys | Ser | Pro | Asp | Ser | Gly | His | 145 | 150 | 155 | 160 |
| Glu | Val | Glu | Leu | Val | Lys | Glu | Glu | Ser | Tyr | Phe | Phe | Asn | Ile | Ser | Lys | 165 | 170 | 175 | |
| Tyr | Thr | Asp | Arg | Leu | Leu | Glu | Phe | Tyr | Asp | Gln | Asn | Pro | Asp | Phe | Ile | 180 | 185 | 190 | |
| Gln | Pro | Pro | Ser | Arg | Lys | Asn | Glu | Met | Ile | Asn | Asn | Phe | Ile | Lys | Pro | 195 | 200 | 205 | |
| Gly | Leu | Ala | Asp | Leu | Ala | Val | Ser | Arg | Thr | Ser | Phe | Asn | Trp | Gly | Val | 210 | 215 | 220 | |
| His | Val | Pro | Ser | Asn | Pro | Lys | His | Val | Val | Tyr | Val | Trp | Ile | Asp | Ala | 225 | 230 | 235 | 240 |
| Leu | Val | Asn | Tyr | Ile | Ser | Ala | Leu | Gly | Tyr | Leu | Ser | Asp | Asp | Glu | Ser | 245 | 250 | 255 | |
| Leu | Phe | Asn | Lys | Tyr | Trp | Pro | Ala | Asp | Ile | His | Leu | Met | Ala | Lys | Glu | 260 | 265 | 270 | |
| Ile | Val | Arg | Phe | His | Ser | Ile | Ile | Trp | Pro | Ile | Leu | Leu | Met | Ala | Leu | 275 | 280 | 285 | |
| Asp | Leu | Pro | Leu | Pro | Lys | Lys | Val | Phe | Ala | His | Gly | Trp | Ile | Leu | Met | 290 | 295 | 300 | |
| Lys | Asp | Gly | Lys | Met | Ser | Lys | Ser | Lys | Gly | Asn | Val | Val | Asp | Pro | Asn | 305 | 310 | 315 | 320 |
| Ile | Leu | Ile | Asp | Arg | Tyr | Gly | Leu | Asp | Ala | Thr | Arg | Tyr | Tyr | Leu | Met | 325 | 330 | 335 | |
| Arg | Glu | Leu | Pro | Phe | Gly | Ser | Asp | Gly | Val | Phe | Thr | Pro | Glu | Ala | Phe | 340 | 345 | 350 | |
| Val | Glu | Arg | Thr | Asn | Phe | Asp | Leu | Ala | Asn | Asp | Leu | Gly | Asn | Leu | Val | 355 | 360 | 365 | |

Asn Arg Thr Ile Ser Met Val Asn Lys Tyr Phe Asp Gly Glu Leu Pro
 370 375 380
 Ala Tyr Gln Gly Pro Leu His Glu Leu Asp Glu Glu Met Glu Ala Met
 385 390 395 400
 Ala Leu Glu Thr Val Lys Ser Tyr Thr Glu Ser Met Glu Ser Leu Gln
 405 410 415
 Phe Ser Val Ala Leu Ser Thr Val Trp Lys Phe Ile Ser Arg Thr Asn
 420 425 430
 Lys Tyr Ile Asp Glu Thr Thr Pro Trp Val Leu Ala Lys Asp Asp Ser
 435 440 445
 Gln Lys Asp Met Leu Gly Asn Val Met Ala His Leu Val Glu Asn Ile
 450 455 460
 Arg Tyr Ala Ala Val Leu Leu Arg Pro Phe Leu Thr His Ala Pro Lys
 465 470 475 480
 Glu Ile Phe Glu Gln Leu Asn Ile Asn Asn Pro Gln Phe Met Glu Phe
 485 490 495
 Ser Ser Leu Glu Gln Tyr Gly Val Leu Asn Glu Ser Ile Met Val Thr
 500 505 510
 Gly Gln Pro Lys Pro Ile Phe Pro Arg Leu Asp Ser Glu Ala Glu Ile
 515 520 525
 Ala Tyr Ile Lys Glu Ser Met Gln Pro Pro Ala Thr Lys Glu Glu Lys
 530 535 540
 Glu Glu Ile Pro Ser Lys Pro Gln Ile Asp Ile Lys Asp Phe Asp Lys
 545 550 555 560
 Val Glu Ile Lys Ala Ala Thr Ile Ile Asp Ala Glu His Val Lys Lys
 565 570 575
 Ser Asp Lys Leu Leu Lys Ile Gln Val Asp Leu Asp Ser Glu Gln Arg
 580 585 590
 Gln Ile Val Ser Gly Ile Ala Lys Phe Tyr Thr Pro Asp Asp Ile Ile
 595 600 605
 Gly Lys Lys Val Ala Val Val Thr Asn Leu Lys Pro Ala Lys Leu Met
 610 615 620
 Gly Gln Lys Ser Glu Gly Met Ile Leu Ser Ala Glu Lys Asp Gly Val
 625 630 635 640
 Leu Thr Leu Val Ser Leu Pro Ser Ala Ile Pro Asn Gly Ala Val Ile
 645 650 655
 Lys

<210> 141
 <211> 1974
 <212> DNA
 <213> *Staphylococcus aureus*

<400> 141
 atggctaaag aaacatttta tataacaacc ccaatatact atcctagtgg gaattttacat 60
 ataggacatg catattctac agtggctgga gatgttattg caagatataa gagaatgcaa 120
 ggatatgatg ttcgctatgt gactggaacg gatgaacacg gtcaaaaaat tcaagaaaaa 180
 gctcaaaaag ctggtaagac agaaattgaa tatttggatg agatgattgc tgggaattaaa 240
 caattgtggg ctaagcttga aatttcaaata gatgatttta tcagaacaac tgaagaacgt 300
 cataaacatg tcgttgagca agtggttgaa cgtttattaa agcaagggtga tatctattta 360
 ggtgaatatg aagggttggtg ttctgttccg gatgaacat actatacaga gtcacaatta 420
 gtagaccac aatacgaaaa cggtaaaatt attggtggca aaagtccaga ttctggacac 480
 gaagtgaac tagttaaaga agaaagtatt ttctttaata ttagtaataa tacagaccgt 540
 ttattagagt tctatgacca aaatccagat ttatacaaac caccatcaag aaaaaatgaa 600
 atgattaaca acttcattaa accaggactt gctgatttag ctgtttctcg tacatcattt 660
 aactggggtg tccctgttcc gtctaattcca aaacatgttg tttatgtttg gattgatgcg 720
 ttagttaact atatttcagc attaggctat atgagtcact atttaacaaa 780
 tactggccag cagatattca tttaattggct aaggaaattg tgcgattcca ctcaattatt 840
 tggcctatgt tattgatggc attagactta ccgttaccta aaaaagtctt tgcacatggg 900
 tggattttga tgaaagatgg aaaaatgagt aaatctaaag gtaatgtcgt agacccta 960
 attttaattg atcgctatgg tttagatgct acacgttatt atctaattgcg tgaattacca 1020
 tttggttcag atggcgtatt tacacctgaa gcatttggtg agcgtacaaa tttcgatcta 1080
 gcaaatgact taggtaactt agtaaaccgt acgatttcta tggttaataa gtactttgat 1140
 ggcgaattac cagcgtatca aggtccactt catgaattag atgaagaaat ggaagctatg 1200
 gctttagaaa cagtgaagag ctacactgaa agcatggaaa gtttgcaatt ttctgtggca 1260
 ttatctacgg tatggaagtt tattagtaga acgaataagt atattgacga aacaaccctt 1320
 tgggtattag ctaaggacga tagccaaaaa gatatgttag gcaatgtaat ggctcactta 1380
 gttgaaaata ttcgttatgc agctgtatta ttacgtccat tcttaacaca tgcgccgaaa 1440
 gagatttttg aacaattgaa cattaacaat cctcaattta tgggaatttag tagtttagag 1500
 caatatgggtg tgcttaatga gtcaattatg gttactgggc aacctaaacc tattttccca 1560
 agattggata gcgaagcgga aattgcatat atcaaagaat caatgcaacc gcctgctact 1620
 aaagaggaaa aagaagagat tcctagcaaa cctcaaattg atattaaaga ctttgataaa 1680
 gttgaaatta aggcagcaac gattattgat gctgaacatg ttaagaagtc agataagctt 1740
 ttaaaaaattc aagtagactt agattctgaa caaagacaaa ttgtatcagg aattgccaaa 1800
 ttctatacac cagatgatat tatttggtaaa aaagtagcag ttgttactaa cctgaaaccg 1860
 gctaaattaa tgggacaaaa atctgaaggt atgatattat ctgctgaaaa agatgggtga 1920
 ttaaccttag taagtttacc aagtgcatt ccaaatgggt cagtgattaa ataa 1974

<210> 142
 <211> 657
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 142
 Met Ala Lys Glu Thr Phe Tyr Ile Thr Thr Pro Ile Tyr Tyr Pro Ser
 1 5 10 15
 Gly Asn Leu His Ile Gly His Ala Tyr Ser Thr Val Ala Gly Asp Val
 20 25 30
 Ile Ala Arg Tyr Lys Arg Met Gln Gly Tyr Asp Val Arg Tyr Leu Thr
 35 40 45
 Gly Thr Asp Glu His Gly Gln Lys Ile Gln Glu Lys Ala Gln Lys Ala
 50 55 60

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Lys | Thr | Glu | Ile | Glu | Tyr | Leu | Asp | Glu | Met | Ile | Ala | Gly | Ile | Lys | 65 | 70 | 75 | 80 |
| Gln | Leu | Trp | Ala | Lys | Leu | Glu | Ile | Ser | Asn | Asp | Asp | Phe | Ile | Arg | Thr | 85 | 90 | 95 | |
| Thr | Glu | Glu | Arg | His | Lys | His | Val | Val | Glu | Gln | Val | Phe | Glu | Arg | Leu | 100 | 105 | 110 | |
| Leu | Lys | Gln | Gly | Asp | Ile | Tyr | Leu | Gly | Glu | Tyr | Glu | Gly | Trp | Tyr | Ser | 115 | 120 | 125 | |
| Val | Pro | Asp | Glu | Thr | Tyr | Tyr | Thr | Glu | Ser | Gln | Leu | Val | Asp | Pro | Gln | 130 | 135 | 140 | |
| Tyr | Glu | Asn | Gly | Lys | Ile | Ile | Gly | Gly | Lys | Ser | Pro | Asp | Ser | Gly | His | 145 | 150 | 155 | 160 |
| Glu | Val | Glu | Leu | Val | Lys | Glu | Glu | Ser | Tyr | Phe | Phe | Asn | Ile | Ser | Lys | 165 | 170 | 175 | |
| Tyr | Thr | Asp | Arg | Leu | Leu | Glu | Phe | Tyr | Asp | Gln | Asn | Pro | Asp | Phe | Ile | 180 | 185 | 190 | |
| Gln | Pro | Pro | Ser | Arg | Lys | Asn | Glu | Met | Ile | Asn | Asn | Phe | Ile | Lys | Pro | 195 | 200 | 205 | |
| Gly | Leu | Ala | Asp | Leu | Ala | Val | Ser | Arg | Thr | Ser | Phe | Asn | Trp | Gly | Val | 210 | 215 | 220 | |
| Pro | Val | Pro | Ser | Asn | Pro | Lys | His | Val | Val | Tyr | Val | Trp | Ile | Asp | Ala | 225 | 230 | 235 | 240 |
| Leu | Val | Asn | Tyr | Ile | Ser | Ala | Leu | Gly | Tyr | Leu | Ser | Asp | Asp | Glu | Ser | 245 | 250 | 255 | |
| Leu | Phe | Asn | Lys | Tyr | Trp | Pro | Ala | Asp | Ile | His | Leu | Met | Ala | Lys | Glu | 260 | 265 | 270 | |
| Ile | Val | Arg | Phe | His | Ser | Ile | Ile | Trp | Pro | Ile | Leu | Leu | Met | Ala | Leu | 275 | 280 | 285 | |
| Asp | Leu | Pro | Leu | Pro | Lys | Lys | Val | Phe | Ala | His | Gly | Trp | Ile | Leu | Met | 290 | 295 | 300 | |
| Lys | Asp | Gly | Lys | Met | Ser | Lys | Ser | Lys | Gly | Asn | Val | Val | Asp | Pro | Asn | 305 | 310 | 315 | 320 |
| Ile | Leu | Ile | Asp | Arg | Tyr | Gly | Leu | Asp | Ala | Thr | Arg | Tyr | Tyr | Leu | Met | 325 | 330 | 335 | |
| Arg | Glu | Leu | Pro | Phe | Gly | Ser | Asp | Gly | Val | Phe | Thr | Pro | Glu | Ala | Phe | 340 | 345 | 350 | |
| Val | Glu | Arg | Thr | Asn | Phe | Asp | Leu | Ala | Asn | Asp | Leu | Gly | Asn | Leu | Val | 355 | 360 | 365 | |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Arg | Thr | Ile | Ser | Met | Val | Asn | Lys | Tyr | Phe | Asp | Gly | Glu | Leu | Pro | 370 | 375 | 380 |
| Ala | Tyr | Gln | Gly | Pro | Leu | His | Glu | Leu | Asp | Glu | Glu | Met | Glu | Ala | Met | 385 | 390 | 395 |
| Ala | Leu | Glu | Thr | Val | Lys | Ser | Tyr | Thr | Glu | Ser | Met | Glu | Ser | Leu | Gln | 405 | 410 | 415 |
| Phe | Ser | Val | Ala | Leu | Ser | Thr | Val | Trp | Lys | Phe | Ile | Ser | Arg | Thr | Asn | 420 | 425 | 430 |
| Lys | Tyr | Ile | Asp | Glu | Thr | Thr | Pro | Trp | Val | Leu | Ala | Lys | Asp | Asp | Ser | 435 | 440 | 445 |
| Gln | Lys | Asp | Met | Leu | Gly | Asn | Val | Met | Ala | His | Leu | Val | Glu | Asn | Ile | 450 | 455 | 460 |
| Arg | Tyr | Ala | Ala | Val | Leu | Leu | Arg | Pro | Phe | Leu | Thr | His | Ala | Pro | Lys | 465 | 470 | 475 |
| Glu | Ile | Phe | Glu | Gln | Leu | Asn | Ile | Asn | Asn | Pro | Gln | Phe | Met | Glu | Phe | 485 | 490 | 495 |
| Ser | Ser | Leu | Glu | Gln | Tyr | Gly | Val | Leu | Asn | Glu | Ser | Ile | Met | Val | Thr | 500 | 505 | 510 |
| Gly | Gln | Pro | Lys | Pro | Ile | Phe | Pro | Arg | Leu | Asp | Ser | Glu | Ala | Glu | Ile | 515 | 520 | 525 |
| Ala | Tyr | Ile | Lys | Glu | Ser | Met | Gln | Pro | Pro | Ala | Thr | Lys | Glu | Glu | Lys | 530 | 535 | 540 |
| Glu | Glu | Ile | Pro | Ser | Lys | Pro | Gln | Ile | Asp | Ile | Lys | Asp | Phe | Asp | Lys | 545 | 550 | 555 |
| Val | Glu | Ile | Lys | Ala | Ala | Thr | Ile | Ile | Asp | Ala | Glu | His | Val | Lys | Lys | 565 | 570 | 575 |
| Ser | Asp | Lys | Leu | Leu | Lys | Ile | Gln | Val | Asp | Leu | Asp | Ser | Glu | Gln | Arg | 580 | 585 | 590 |
| Gln | Ile | Val | Ser | Gly | Ile | Ala | Lys | Phe | Tyr | Thr | Pro | Asp | Asp | Ile | Ile | 595 | 600 | 605 |
| Gly | Lys | Lys | Val | Ala | Val | Val | Thr | Asn | Leu | Lys | Pro | Ala | Lys | Leu | Met | 610 | 615 | 620 |
| Gly | Gln | Lys | Ser | Glu | Gly | Met | Ile | Leu | Ser | Ala | Glu | Lys | Asp | Gly | Val | 625 | 630 | 635 |
| Leu | Thr | Leu | Val | Ser | Leu | Pro | Ser | Ala | Ile | Pro | Asn | Gly | Ala | Val | Ile | 645 | 650 | 655 |

Lys

<210> 143
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 143
 gcggcgcccc atatgagtac attagaacaa acaatag

37

<210> 144
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 144
 gcgcgatcc ttaatagcct ttcagcgcg c

31

<210> 145
 <211> 30
 <212> PRT
 <213> Staphylococcus aureus

<400> 145
 Trp Gly Val His Val Pro Ser Asn Pro Lys His Val Val Tyr Val Trp
 1 5 10 15

Ile Asp Ala Leu Val Asn Tyr Ile Ser Ala Leu Gly Tyr Leu
 20 25 30

<210> 146
 <211> 17
 <212> PRT
 <213> Staphylococcus aureus

<400> 146
 Asp Gly Val Leu Thr Leu Val Ser Leu Pro Ser Ala Ile Pro Asn Gly
 1 5 10 15

Ala

<210> 147
 <211> 22
 <212> PRT
 <213> Staphylococcus aureus

<400> 147

His Lys His Val Val Glu Gln Val Phe Glu Arg Leu Leu Lys Gln Gly
 1 5 10 15

Asp Ile Tyr Leu Gly Glu
 20

<210> 148

<211> 1263

<212> DNA

<213> Staphylococcus aureus

<400> 148

atgacgaatg tattaattga agatttaaaa tggagaggtc ttatttatca acaaactgat 60
 gaacaaggta ttgaagattt attaaataaa gaacaagtga cggttatactg cgggtgccgat 120
 ccaacggcag atagttttaca tattgggtcac ttactacat tcttaacatt aagacgtttt 180
 caagaacatg gacatcggtcc tatcggtttta attggcgggtg gtacagggtat gattgggtgat 240
 ccatcaggta aatcagaaga acgtgtgcta caaacagaag aacaagtaga taaaaatatac 300
 gaaggtatta gtaagcaaatt gcacaatat tttgaatttg gaacagacca tgggtgcagtg 360
 cttgttaata atagagactg gttaggacaa atctcattaa ttagtttttt acgtgactat 420
 ggtaaacacg tccggcggttaa ttacatgtta ggtaaagatt caatccaaag tcgttttagaa 480
 catggatatt catatacaga attcacatac acgattttac aagctattga tttcgggtcat 540
 ttgaatagag aattgaattg taagattcaa gtagggtggat cagatcaatg gggtaatatc 600
 acaagtggta ttgaattaat gcgtcgtatg tatgggtcaaa cagacgcata cggtttaact 660
 attccgcttg taactaaatc agatggtaag aaatttggtg agtctgagtc aggtgctggt 720
 tgggttagatg ctgaaaaaac aagtccttat gaattttatc aattctggat taatcaatca 780
 gacgaagatg taattaaatt cttaaaatac tttactttct taggaaaaga agaaattgat 840
 cgcttagaac aatctaaaaa tgaagcacgg catttacgtg aagctcaaaa aacattagct 900
 gaagaagtaa ctaaatttat tcatgggtgaa gatgcattaa atgatgcaat ccgtatttca 960
 caagcattat ttagtggtga tttaaaatca ttatcagcga aagaattaaa agatggattt 1020
 aaagatgtgc ctcaagtgc attatcaaat gacacaacaa atatcggtga agtccttatt 1080
 gaaacaggca tttctccttc taaacgacaa gcacgtgaag atgttaacaa tgggtgcgatt 1140
 tatattaatg gtgagagaca acaagatgtt aattatgctt tagcaccaga agataaaatt 1200
 gatggcgaat ttacgattat tcgtcgcggt aagaaaaaat acttcatggt taactatcaa 1260
 taa 1263

<210> 149

<211> 420

<212> PRT

<213> Staphylococcus aureus

<400> 149

Met Thr Asn Val Leu Ile Glu Asp Leu Lys Trp Arg Gly Leu Ile Tyr
 1 5 10 15

Gln Gln Thr Asp Glu Gln Gly Ile Glu Asp Leu Leu Asn Lys Glu Gln
 20 25 30

Val Thr Leu Tyr Cys Gly Ala Asp Pro Thr Ala Asp Ser Leu His Ile
 35 40 45

Gly His Leu Leu Pro Phe Leu Thr Leu Arg Arg Phe Gln Glu His Gly
 50 55 60

His Arg Pro Ile Val Leu Ile Gly Gly Gly Thr Gly Met Ile Gly Asp
 65 70 75 80

| | | | | | | | | | | | | | | | |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Pro | Ser | Gly | Lys | Ser 85 | Glu | Glu | Arg | Val | Leu 90 | Gln | Thr | Glu | Glu | Gln 95 | Val |
| Asp | Lys | Asn | Ile 100 | Glu | Gly | Ile | Ser | Lys 105 | Gln | Met | His | Asn | Ile 110 | Phe | Glu |
| Phe | Gly | Thr 115 | Asp | His | Gly | Ala | Val 120 | Leu | Val | Asn | Asn | Arg 125 | Asp | Trp | Leu |
| Gly | Gln 130 | Ile | Ser | Leu | Ile | Ser 135 | Phe | Leu | Arg | Asp | Tyr 140 | Gly | Lys | His | Val |
| Gly 145 | Val | Asn | Tyr | Met | Leu 150 | Gly | Lys | Asp | Ser | Ile 155 | Gln | Ser | Arg | Leu | Glu 160 |
| His | Gly | Ile | Ser 165 | Tyr | Thr | Glu | Phe | Thr 170 | Tyr | Thr | Ile | Leu | Gln 175 | Ala | Ile |
| Asp | Phe | Gly | His 180 | Leu | Asn | Arg | Glu | Leu 185 | Asn | Cys | Lys | Ile | Gln 190 | Val | Gly |
| Gly | Ser 195 | Asp | Gln | Trp | Gly | Asn 200 | Ile | Thr | Ser | Gly | Ile 205 | Glu | Leu | Met | Arg |
| Arg | Met 210 | Tyr | Gly | Gln | Thr | Asp 215 | Ala | Tyr | Gly | Leu | Thr 220 | Ile | Pro | Leu | Val |
| Thr 225 | Lys | Ser | Asp | Gly 230 | Lys | Lys | Phe | Gly | Lys | Ser 235 | Glu | Ser | Gly | Ala 240 | Val |
| Trp | Leu | Asp | Ala 245 | Glu | Lys | Thr | Ser | Pro | Tyr 250 | Glu | Phe | Tyr | Gln | Phe 255 | Trp |
| Ile | Asn | Gln 260 | Ser | Asp | Glu | Asp | Val | Ile 265 | Lys | Phe | Leu | Lys | Tyr 270 | Phe | Thr |
| Phe | Leu | Gly 275 | Lys | Glu | Glu | Ile | Asp 280 | Arg | Leu | Glu | Gln | Ser 285 | Lys | Asn | Glu |
| Ala | Pro 290 | His | Leu | Arg | Glu | Ala 295 | Gln | Lys | Thr | Leu | Ala 300 | Glu | Glu | Val | Thr |
| Lys 305 | Phe | Ile | His | Gly 310 | Glu | Asp | Ala | Leu | Asn | Asp 315 | Ala | Ile | Arg | Ile | Ser 320 |
| Gln | Ala | Leu | Phe 325 | Ser | Gly | Asp | Leu | Lys | Ser 330 | Leu | Ser | Ala | Lys | Glu 335 | Leu |
| Lys | Asp | Gly 340 | Phe | Lys | Asp | Val | Pro | Gln 345 | Val | Thr | Leu | Ser | Asn 350 | Asp | Thr |
| Thr | Asn 355 | Ile | Val | Glu | Val | Leu | Ile 360 | Glu | Thr | Gly | Ile | Ser 365 | Pro | Ser | Lys |
| Arg | Gln 370 | Ala | Arg | Glu | Asp | Val 375 | Asn | Asn | Gly | Ala | Ile 380 | Tyr | Ile | Asn | Gly |

Glu Arg Gln Gln Asp Val Asn Tyr Ala Leu Ala Pro Glu Asp Lys Ile
385 390 395 400

Asp Gly Glu Phe Thr Ile Ile Arg Arg Gly Lys Lys Lys Tyr Phe Met
405 410 415

Val Asn Tyr Gln
420

<210> 150
<211> 1263
<212> DNA
<213> Staphylococcus aureus

<400> 150
atgacgaatg tattaattga agatttataaa tggagagggtc ttattttatca acaaactgat 60
gaacaaggta ttgaagattt attaaataaa gaacaagtga cgttatactg cggtgccgat 120
ccaacggcag atagttttaca tattgggtcac ttactacctt tcttaacatt aagacgtttt 180
caagaacatg gacatcggtcc tatcggtttta attggcgggtg gtactgggtat gattgggtgat 240
ccatcaggta aatcagaaga acgtgtgcta caaacagaag aacaagtaga taaaaaatatc 300
gaaggattta gtaagcaaat gcacaatatt tttgaatttg gaacagacca tgggtgcagtg 360
cttgtaata atagagactg gttaggacaa atctcattaa ttagtttttt acgtgactat 420
ggtaaacacg tcggcggttaa ttacatgtta ggtaaagatt caatccaaag tcgttttagaa 480
catggtattt catatacaga attcacatac acgatttttac aagctattga tttcgggtcat 540
ttgaatagag aattgaattg tgagattcaa gtaggtggat cagatcaatg gggtaaatatc 600
acaagtggta ttgaattaat gcgtcgtatg tatgggtcaaa cagacgcata cggtttaact 660
attccgcttg taactaaatc agatggtaag aaattttggta agtctgagtc aggtgctgtt 720
tgggttagatg ctgaaaaaac aagtccttat gaatttttat aattctggat taatcaatca 780
gacgaagatg taattaaatt cttaaaatac tttactttct taggaaaaga agaaattgat 840
cgcttagaac aatctaaaaa tgaagcacgc catttacgtg aagctcaaaa aacattagct 900
gaagaagtaa ctaaatttat tcatgggtgaa gatgcattaa atgatgcaat ccgtatttca 960
caagcattat ttagtggtga tttaaaatca ttatcagcga aagaattaaa agatgggttt 1020
aaagatgtgc ctcaagtgc attatcaaat gacacaacaa atatcggtga agtccttatt 1080
gaaacaggca tttctccttc taaacgacaa gcacgtgaag atgttaacaa tgggtgcgatt 1140
tatattaatg gtgagagaca acaagatgtt aattatgctt tagcaccaga agataaaaatt 1200
gatgcgaat ttacgattat tcgtcgcggt aagaaaaaat acttcatggt taactatcaa 1260
taa 1263

<210> 151
<211> 420
<212> PRT
<213> Staphylococcus aureus

<400> 151
Met Thr Asn Val Leu Ile Glu Asp Leu Lys Trp Arg Gly Leu Ile Tyr
1 5 10 15
Gln Gln Thr Asp Glu Gln Gly Ile Glu Asp Leu Leu Asn Lys Glu Gln
20 25 30
Val Thr Leu Tyr Cys Gly Ala Asp Pro Thr Ala Asp Ser Leu His Ile
35 40 45
Gly His Leu Leu Pro Phe Leu Thr Leu Arg Arg Phe Gln Glu His Gly
50 55 60

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| His | Arg | Pro | Ile | Val | Leu | Ile | Gly | Gly | Gly | Thr | Gly | Met | Ile | Gly | Asp | 65 | 70 | 75 | 80 |
| Pro | Ser | Gly | Lys | Ser | Glu | Glu | Arg | Val | Leu | Gln | Thr | Glu | Glu | Gln | Val | 85 | 90 | 95 | |
| Asp | Lys | Asn | Ile | Glu | Gly | Ile | Ser | Lys | Gln | Met | His | Asn | Ile | Phe | Glu | 100 | 105 | 110 | |
| Phe | Gly | Thr | Asp | His | Gly | Ala | Val | Leu | Val | Asn | Asn | Arg | Asp | Trp | Leu | 115 | 120 | 125 | |
| Gly | Gln | Ile | Ser | Leu | Ile | Ser | Phe | Leu | Arg | Asp | Tyr | Gly | Lys | His | Val | 130 | 135 | 140 | |
| Gly | Val | Asn | Tyr | Met | Leu | Gly | Lys | Asp | Ser | Ile | Gln | Ser | Arg | Leu | Glu | 145 | 150 | 155 | 160 |
| His | Gly | Ile | Ser | Tyr | Thr | Glu | Phe | Thr | Tyr | Thr | Ile | Leu | Gln | Ala | Ile | 165 | 170 | 175 | |
| Asp | Phe | Gly | His | Leu | Asn | Arg | Glu | Leu | Asn | Cys | Glu | Ile | Gln | Val | Gly | 180 | 185 | 190 | |
| Gly | Ser | Asp | Gln | Trp | Gly | Asn | Ile | Thr | Ser | Gly | Ile | Glu | Leu | Met | Arg | 195 | 200 | 205 | |
| Arg | Met | Tyr | Gly | Gln | Thr | Asp | Ala | Tyr | Gly | Leu | Thr | Ile | Pro | Leu | Val | 210 | 215 | 220 | |
| Thr | Lys | Ser | Asp | Gly | Lys | Lys | Phe | Gly | Lys | Ser | Glu | Ser | Gly | Ala | Val | 225 | 230 | 235 | 240 |
| Trp | Leu | Asp | Ala | Glu | Lys | Thr | Ser | Pro | Tyr | Glu | Phe | Tyr | Gln | Phe | Trp | 245 | 250 | 255 | |
| Ile | Asn | Gln | Ser | Asp | Glu | Asp | Val | Ile | Lys | Phe | Leu | Lys | Tyr | Phe | Thr | 260 | 265 | 270 | |
| Phe | Leu | Gly | Lys | Glu | Glu | Ile | Asp | Arg | Leu | Glu | Gln | Ser | Lys | Asn | Glu | 275 | 280 | 285 | |
| Ala | Pro | His | Leu | Arg | Glu | Ala | Gln | Lys | Thr | Leu | Ala | Glu | Glu | Val | Thr | 290 | 295 | 300 | |
| Lys | Phe | Ile | His | Gly | Glu | Asp | Ala | Leu | Asn | Asp | Ala | Ile | Arg | Ile | Ser | 305 | 310 | 315 | 320 |
| Gln | Ala | Leu | Phe | Ser | Gly | Asp | Leu | Lys | Ser | Leu | Ser | Ala | Lys | Glu | Leu | 325 | 330 | 335 | |
| Lys | Asp | Gly | Phe | Lys | Asp | Val | Pro | Gln | Val | Thr | Leu | Ser | Asn | Asp | Thr | 340 | 345 | 350 | |
| Thr | Asn | Ile | Val | Glu | Val | Leu | Ile | Glu | Thr | Gly | Ile | Ser | Pro | Ser | Lys | 355 | 360 | 365 | |

Arg Gln Ala Arg Glu Asp Val Asn Asn Gly Ala Ile Tyr Ile Asn Gly
 370 375 380

Glu Arg Gln Gln Asp Val Asn Tyr Ala Leu Ala Pro Glu Asp Lys Ile
 385 390 395 400

Asp Gly Glu Phe Thr Ile Ile Arg Arg Gly Lys Lys Lys Tyr Phe Met
 405 410 415

Val Asn Tyr Gln
 420

<210> 152

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 152

gcggcggccc atatgggcac gaccaaacac ag

32

<210> 153

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 153

gcgcggatcc ttagatatga tcaaaaatga tctcag

36

<210> 154

<211> 16

<212> PRT

<213> Staphylococcus aureus

<400> 154

Ala Asp Ser Leu His Ile Gly His Leu Leu Pro Phe Leu Thr Leu Arg
 1 5 10 15

<210> 155

<211> 11

<212> PRT

<213> Staphylococcus aureus

<400> 155

Lys Glu Gln Val Thr Leu Tyr Cys Gly Ala Asp
 1 5 10

```
<210> 156
<211> 9
<212> PRT
<213> Staphylococcus aureus
```

```
<400> 156
Ile Val Glu Val Leu Ile Glu Thr Gly
  1             5
```

```
<210> 157
<211> 1263
<212> DNA
<213> Staphylococcus aureus
```

| | | | | | | | |
|------------|-------------|------------|-------------|------------|-------------|------|--|
| <400> | 157 | | | | | | |
| atgattaaaa | tacctagagg | gacgcaggat | attttacctg | aagattcaaa | gaaatggcgt | 60 | |
| tacattgaaa | atcaattaga | tgaattaatg | acattttata | attataaaga | aataagaaca | 120 | |
| ccaatttttg | aaagtcacaga | tctttttgca | agaggtgttg | gtgattcaac | cgatgtcgta | 180 | |
| caaaaagaaa | tgtatacatt | taaagataaa | ggcgatagaa | gtattaccat | aagacctgag | 240 | |
| ggaacagctg | cagttgtgcg | ttcatatatt | gaacataaaa | tgcaaggtaa | tccaaaccaa | 300 | |
| ccaattaaac | tttattacaa | tggaccgatg | tttagatatg | aacgtaagca | aaaaggacgc | 360 | |
| tatcgtcaat | ttaatcaatt | tgggtgtaga | gctattgggtg | ctgaaaatcc | tagcgtagat | 420 | |
| gcagaagtat | tagctatggt | tatgcatatt | tatcaatcat | ttggattaaa | acattttaag | 480 | |
| cttgttatta | ataggttagg | ggatatggcg | tctcgaaaag | aatataacga | agcgttagtg | 540 | |
| aaacactttg | aaccagtaat | tcatgaattt | tgttcagatt | gtcaatcacg | tttgcataca | 600 | |
| aatccgatgc | gaatttttga | ttgtaaagta | gcacgtgata | agaagcgat | taagactgca | 660 | |
| cctagaatca | ctgattttct | aaatgaggaa | tctaaggcat | attatgaaca | agtaaaagct | 720 | |
| tatttagatg | atttaggtat | tccatatatt | gaagatccta | acttagttcg | tggattggat | 780 | |
| tattatacac | atacagcatt | tgaattaatg | atggataaacc | ctaactatga | tgggtgccatt | 840 | |
| acaacgcttt | gtggtggtgg | ccgttataat | ggtttatttag | aattgctaga | tgggtccaagt | 900 | |
| gaaacaggta | ttggttttgc | gctaagtata | gaacgattat | tgcttgcast | tgaagaagaa | 960 | |
| gggatcgaat | tagatattga | agaaaactta | gattttattca | ttgttacaat | gggtgatcaa | 1020 | |
| gcagatcgat | atgctgtgaa | gctatttaat | catttgagac | ataatggtat | taaagcagat | 1080 | |
| aaagactatt | tacagcgtaa | aattaaagga | caaatgaaac | aagcagaccg | tttaggtgcc | 1140 | |
| aagtttacia | tcgttattgg | tgatcaagaa | ttagaaaaata | ataaaatcga | tgttaaaaat | 1200 | |
| atgacaactg | gtgaatctga | aacaattgaa | ttagacgcatt | tagtcgaata | ttttaagaag | 1260 | |
| tag | | | | | | 1263 | |

```
<210> 158
<211> 420
<212> PRT
<213> Staphylococcus aureus
```

```
<400> 158
Met Ile Lys Ile Pro Arg Gly Thr Gln Asp Ile Leu Pro Glu Asp Ser
   1                               5               10           15

Lys Lys Trp Arg Tyr Ile Glu Asn Gln Leu Asp Glu Leu Met Thr Phe
      20                     25             30

Tyr Asn Tyr Lys Glu Ile Arg Thr Pro Ile Phe Glu Ser Thr Asp Leu
     35                   40                 45

Phe Ala Arg Gly Val Gly Asp Ser Thr Asp Val Val Gln Lys Glu Met
    50                55              60
```

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | Thr | Phe | Lys | Asp | Lys | Gly | Asp | Arg | Ser | Ile | Thr | Leu | Arg | Pro | Glu | 65 | 70 | 75 | 80 |
| Gly | Thr | Ala | Ala | Val | Val | Arg | Ser | Tyr | Ile | Glu | His | Lys | Met | Gln | Gly | 85 | 90 | 95 | |
| Asn | Pro | Asn | Gln | Pro | Ile | Lys | Leu | Tyr | Tyr | Asn | Gly | Pro | Met | Phe | Arg | 100 | 105 | 110 | |
| Tyr | Glu | Arg | Lys | Gln | Lys | Gly | Arg | Tyr | Arg | Gln | Phe | Asn | Gln | Phe | Gly | 115 | 120 | 125 | |
| Val | Glu | Ala | Ile | Gly | Ala | Glu | Asn | Pro | Ser | Val | Asp | Ala | Glu | Val | Leu | 130 | 135 | 140 | |
| Ala | Met | Val | Met | His | Ile | Tyr | Gln | Ser | Phe | Gly | Leu | Lys | His | Leu | Lys | 145 | 150 | 155 | 160 |
| Leu | Val | Ile | Asn | Ser | Val | Gly | Asp | Met | Ala | Ser | Arg | Lys | Glu | Tyr | Asn | 165 | 170 | 175 | |
| Glu | Ala | Leu | Val | Lys | His | Phe | Glu | Pro | Val | Ile | His | Glu | Phe | Cys | Ser | 180 | 185 | 190 | |
| Asp | Cys | Gln | Ser | Arg | Leu | His | Thr | Asn | Pro | Met | Arg | Ile | Leu | Asp | Cys | 195 | 200 | 205 | |
| Lys | Val | Asp | Arg | Asp | Lys | Glu | Ala | Ile | Lys | Thr | Ala | Pro | Arg | Ile | Thr | 210 | 215 | 220 | |
| Asp | Phe | Leu | Asn | Glu | Glu | Ser | Lys | Ala | Tyr | Tyr | Glu | Gln | Val | Lys | Ala | 225 | 230 | 235 | 240 |
| Tyr | Leu | Asp | Asp | Leu | Gly | Ile | Pro | Tyr | Ile | Glu | Asp | Pro | Asn | Leu | Val | 245 | 250 | 255 | |
| Arg | Gly | Leu | Asp | Tyr | Tyr | Thr | His | Thr | Ala | Phe | Glu | Leu | Met | Met | Asp | 260 | 265 | 270 | |
| Asn | Pro | Asn | Tyr | Asp | Gly | Ala | Ile | Thr | Thr | Leu | Cys | Gly | Gly | Gly | Arg | 275 | 280 | 285 | |
| Tyr | Asn | Gly | Leu | Leu | Glu | Leu | Leu | Asp | Gly | Pro | Ser | Glu | Thr | Gly | Ile | 290 | 295 | 300 | |
| Gly | Phe | Ala | Leu | Ser | Ile | Glu | Arg | Leu | Leu | Leu | Ala | Leu | Glu | Glu | Glu | 305 | 310 | 315 | 320 |
| Gly | Ile | Glu | Leu | Asp | Ile | Glu | Glu | Asn | Leu | Asp | Leu | Phe | Ile | Val | Thr | 325 | 330 | 335 | |
| Met | Gly | Asp | Gln | Ala | Asp | Arg | Tyr | Ala | Val | Lys | Leu | Leu | Asn | His | Leu | 340 | 345 | 350 | |
| Arg | His | Asn | Gly | Ile | Lys | Ala | Asp | Lys | Asp | Tyr | Leu | Gln | Arg | Lys | Ile | 355 | 360 | 365 | |

Lys Gly Gln Met Lys Gln Ala Asp Arg Leu Gly Ala Lys Phe Thr Ile
 370 375 380
 Val Ile Gly Asp Gln Glu Leu Glu Asn Asn Lys Ile Asp Val Lys Asn
 385 390 395 400
 Met Thr Thr Gly Glu Ser Glu Thr Ile Glu Leu Asp Ala Leu Val Glu
 405 410 415
 Tyr Phe Lys Lys
 420

<210> 159
 <211> 1263
 <212> DNA
 <213> *Staphylococcus aureus*

<400> 159
 atgattaaaa tacctagagg gacgcaggat attttacctg aagattcaaa gaaatggcgt 60
 tacattgaaa atcaattaga tgaattaatg acattttata attataaaga aataagaaca 120
 ccaatttttg aaagtacaga tctttttgca agaggtgttg gtgattcaac cgatgtcgtg 180
 caaaaagaaa tgtatacatt taaagataaa ggcgatagaa gtattacatt aagatctgaa 240
 ggaacagctg cagttgtgcg ttcatatatt gaacataaaa tgcaaggtaa tccaaaccaa 300
 ccaattaaac tttattacaa tggaccgatg tttagatatg aacgtaagca aaaaggacgc 360
 tatcgtcaat ttaatcaatt tgggtgtagaa gctattggtg ctgaaaatcc tagcgtagat 420
 gcagaagtat tagctatggg tatgcatatt tatcaatcat ttggattaaa acattttaaag 480
 attgttatta atagtgtagg ggatatggcg tctcgaaaag aatataacga agcgtttagtg 540
 aaacactttg aaccagtaat tcatgaattt tggttcagatt gtcaatcacg tttgcataca 600
 aatccgatgc gaatttttga ttgtaaagta gaccgtgata aagaagcgat taagactgca 660
 cctagaatca ctgatttctt aaatgaggaa tctaaggcat attatgaaca agtaaaagct 720
 tatttagatg atttaggtat tccatatatt gaagatccta acttagttcg tggattggat 780
 tattatacac atacagcatt tgaattaatg atggataacc ctaactatga tgggtgccatt 840
 acaacgcttt gtggtggtgg ccgtttataat gggtttattag aattgctaga tgggtccaagt 900
 gaaacaggta ttggtttttgc gctaagtata gaacgattat tgcttgcaact tgaagaagaa 960
 ggtatcgaat tagatattga agaaaacttg gattttattca ttgttacaat ggggtgatcaa 1020
 gcagatcgat atgctgtgaa gctatttaaat catttgagac ataatgggat taaagcagat 1080
 aaagactatt tacagcgtaa aattaaagga caaatgaaac aagcagaccg tttaggtgcc 1140
 aagtttacaa tcgttattgg tgatcaagaa ttagaaaata ataaaatcga tgttaaaaat 1200
 attacaactg gtgaatctga aacaattgaa ttagacgcat tagtcgaata ttttaagaag 1260
 tag 1263

<210> 160
 <211> 420
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 160
 Met Ile Lys Ile Pro Arg Gly Thr Gln Asp Ile Leu Pro Glu Asp Ser
 1 5 10 15
 Lys Lys Trp Arg Tyr Ile Glu Asn Gln Leu Asp Glu Leu Met Thr Phe
 20 25 30
 Tyr Asn Tyr Lys Glu Ile Arg Thr Pro Ile Phe Glu Ser Thr Asp Leu
 35 40 45

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Phe | Ala | Arg | Gly | Val | Gly | Asp | Ser | Thr | Asp | Val | Val | Gln | Lys | Glu | Met | 50 | 55 | 60 | |
| Tyr | Thr | Phe | Lys | Asp | Lys | Gly | Asp | Arg | Ser | Ile | Thr | Leu | Arg | Ser | Glu | 65 | 70 | 75 | 80 |
| Gly | Thr | Ala | Ala | Val | Val | Arg | Ser | Tyr | Ile | Glu | His | Lys | Met | Gln | Gly | 85 | 90 | 95 | |
| Asn | Pro | Asn | Gln | Pro | Ile | Lys | Leu | Tyr | Tyr | Asn | Gly | Pro | Met | Phe | Arg | 100 | 105 | 110 | |
| Tyr | Glu | Arg | Lys | Gln | Lys | Gly | Arg | Tyr | Arg | Gln | Phe | Asn | Gln | Phe | Gly | 115 | 120 | 125 | |
| Val | Glu | Ala | Ile | Gly | Ala | Glu | Asn | Pro | Ser | Val | Asp | Ala | Glu | Val | Leu | 130 | 135 | 140 | |
| Ala | Met | Val | Met | His | Ile | Tyr | Gln | Ser | Phe | Gly | Leu | Lys | His | Leu | Lys | 145 | 150 | 155 | 160 |
| Ile | Val | Ile | Asn | Ser | Val | Gly | Asp | Met | Ala | Ser | Arg | Lys | Glu | Tyr | Asn | 165 | 170 | 175 | |
| Glu | Ala | Leu | Val | Lys | His | Phe | Glu | Pro | Val | Ile | His | Glu | Phe | Cys | Ser | 180 | 185 | 190 | |
| Asp | Cys | Gln | Ser | Arg | Leu | His | Thr | Asn | Pro | Met | Arg | Ile | Leu | Asp | Cys | 195 | 200 | 205 | |
| Lys | Val | Asp | Arg | Asp | Lys | Glu | Ala | Ile | Lys | Thr | Ala | Pro | Arg | Ile | Thr | 210 | 215 | 220 | |
| Asp | Phe | Leu | Asn | Glu | Glu | Ser | Lys | Ala | Tyr | Tyr | Glu | Gln | Val | Lys | Ala | 225 | 230 | 235 | 240 |
| Tyr | Leu | Asp | Asp | Leu | Gly | Ile | Pro | Tyr | Ile | Glu | Asp | Pro | Asn | Leu | Val | 245 | 250 | 255 | |
| Arg | Gly | Leu | Asp | Tyr | Tyr | Thr | His | Thr | Ala | Phe | Glu | Leu | Met | Met | Asp | 260 | 265 | 270 | |
| Asn | Pro | Asn | Tyr | Asp | Gly | Ala | Ile | Thr | Thr | Leu | Cys | Gly | Gly | Gly | Arg | 275 | 280 | 285 | |
| Tyr | Asn | Gly | Leu | Leu | Glu | Leu | Leu | Asp | Gly | Pro | Ser | Glu | Thr | Gly | Ile | 290 | 295 | 300 | |
| Gly | Phe | Ala | Leu | Ser | Ile | Glu | Arg | Leu | Leu | Leu | Ala | Leu | Glu | Glu | Glu | 305 | 310 | 315 | 320 |
| Gly | Ile | Glu | Leu | Asp | Ile | Glu | Glu | Asn | Leu | Asp | Leu | Phe | Ile | Val | Thr | 325 | 330 | 335 | |
| Met | Gly | Asp | Gln | Ala | Asp | Arg | Tyr | Ala | Val | Lys | Leu | Leu | Asn | His | Leu | 340 | 345 | 350 | |

```
<210> 161
<211> 33
<212> DNA
<213> Artificial Sequence
```

```
<220>
<223> Description of Artificial Sequence: Synthetic
        primer
```

```
<400> 161
gcggcgcccc atatggctcg tacaacaccc atc 33
```

```
<210> 162
<211> 37
<212> DNA
<213> Artificial Sequence
```

```
<220>
<223> Description of Artificial Sequence: Synthetic
        primer
```

<400> 162
gcgcggatcc ttattattta ccacgggctt caattac 37

```
<210> 163
<211> 30
<212> PRT
<213> Staphylococcus aureus
```

```
<400> 163
Asn Pro Ser Val Asp Ala Glu Val Leu Ala Met Val Met His Ile Tyr
  1             5             10             15
```

Gln Ser Phe Gly Leu Lys His Leu Lys Leu Val Ile Asn Ser
20 25 30

<210> 164
 <211> 21
 <212> PRT
 <213> Staphylococcus aureus

<400> 164
 Glu Ala Leu Val Lys His Phe Glu Pro Val Ile His Glu Phe Cys Ser
 1 5 10 15
 Asp Cys Gln Ser Arg
 20

<210> 165
 <211> 11
 <212> PRT
 <213> Staphylococcus aureus

<400> 165
 Thr Ala Ala Val Val Arg Ser Tyr Ile Glu His
 1 5 10

<210> 166
 <211> 633
 <212> DNA
 <213> Staphylococcus aureus

<400> 166
 ttgaggatga ataaaaatgtc agctttttata actttttgagg gcccagaagg ctctggaaaa 60
 acaactgtaa ttaatgaagt ttaccataga ttagtaaaaag attatgatgt cattatgact 120
 agagaaccag gtggtgttcc tactggtgaa gaaatacgtg aaattgtatt agaaggcaat 180
 gatatggaca ttagaactga agcaatgtta tttgctgcat ctagaagaga acatcttgta 240
 ttaaagggtca taccagcttt aaaagaaggt aagggttgtgt tgtgtgatcg ctatatcgat 300
 agttcattag cttatcaagg ttatgctaga gggattggcg ttgaagaagt aagagcatta 360
 aacgaatttg caataaatgg attatatcca gacttgacga tttattttaa tgttagtgtc 420
 gaagtaggtc gcgaacgtat tattaaaaat tcaagagatc aaaatagatt agatcaagaa 480
 gatttaaagt ttcacgaaaa agtaattgaa ggttaccaag aaatcattca taatgaatca 540
 caacggttca aaagcgtaa tgcagatcaa cctcttgaaa atgttggtga agacacgtat 600
 caaactatca tcaaatatct agaaaagata tga 633

<210> 167
 <211> 210
 <212> PRT
 <213> Staphylococcus aureus

<400> 167
 Leu Arg Met Asn Lys Met Ser Ala Phe Ile Thr Phe Glu Gly Pro Glu
 1 5 10 15
 Gly Ser Gly Lys Thr Thr Val Ile Asn Glu Val Tyr His Arg Leu Val
 20 25 30
 Lys Asp Tyr Asp Val Ile Met Thr Arg Glu Pro Gly Gly Val Pro Thr
 35 40 45

Gly Glu Glu Ile Arg Lys Ile Val Leu Glu Gly Asn Asp Met Asp Ile
 50 55 60
 Arg Thr Glu Ala Met Leu Phe Ala Ala Ser Arg Arg Glu His Leu Val
 65 70 75 80
 Leu Lys Val Ile Pro Ala Leu Lys Glu Gly Lys Val Val Leu Cys Asp
 85 90 95
 Arg Tyr Ile Asp Ser Ser Leu Ala Tyr Gln Gly Tyr Ala Arg Gly Ile
 100 105 110
 Gly Val Glu Glu Val Arg Ala Leu Asn Glu Phe Ala Ile Asn Gly Leu
 115 120 125
 Tyr Pro Asp Leu Thr Ile Tyr Leu Asn Val Ser Ala Glu Val Gly Arg
 130 135 140
 Glu Arg Ile Ile Lys Asn Ser Arg Asp Gln Asn Arg Leu Asp Gln Glu
 145 150 155 160
 Asp Leu Lys Phe His Glu Lys Val Ile Glu Gly Tyr Gln Glu Ile Ile
 165 170 175
 His Asn Glu Ser Gln Arg Phe Lys Ser Val Asn Ala Asp Gln Pro Leu
 180 185 190
 Glu Asn Val Val Glu Asp Thr Tyr Gln Thr Ile Ile Lys Tyr Leu Glu
 195 200 205
 Lys Ile
 210

<210> 168
 <211> 633
 <212> DNA
 <213> Staphylococcus aureus

<400> 168
 ttgaggatga ataaaatgtc agctttttata acttttgagg gcccagaagg ctctggaaaa 60
 acaactgtaa ttaatgaagt ttaccataga ttagtaaaag attatgatgt cattatgact 120
 agagaaccag gtggtgttcc tactggtgaa gaaatacgta aaattgtatt agaaggcaat 180
 gatattggaca ttagaactga agcaatgtta tttgctgcat ctagaagaga acatcttgta 240
 ttaaagggtca taccagcttt aaaagaaggt aagggtgtgt tgtgtgatcg ctatatcgat 300
 agttcattag cttatcaagg ttatgctaga gggattggcg ttgaagaagt aagagcatta 360
 aacgaatttg caataaatgg attatatcca gacttgacga tttattttaaa tgtagtgct 420
 gaagtaggtc gcgaacgtat tattaataaat tcaagagatc aaaatagatt agatcaagaa 480
 gatttaaaagt ttcacgaaaa agtaattgaa ggttaccaag aaatcattca taatgaatca 540
 caacggttca aaagcggtta tgcagatcaa cctcttgaaa atgttggtga agacacgtat 600
 caaactatca tcaaataattt agaaaagata tga 633

<210> 169
 <211> 210
 <212> PRT
 <213> Staphylococcus aureus

<400> 169

Leu Arg Met Asn Lys Met Ser Ala Phe Ile Thr Phe Glu Gly Pro Glu
 1 5 10 15

Gly Ser Gly Lys Thr Thr Val Ile Asn Glu Val Tyr His Arg Leu Val
 20 25 30

Lys Asp Tyr Asp Val Ile Met Thr Arg Glu Pro Gly Gly Val Pro Thr
 35 40 45

Gly Glu Glu Ile Arg Lys Ile Val Leu Glu Gly Asn Asp Met Asp Ile
 50 55 60

Arg Thr Glu Ala Met Leu Phe Ala Ala Ser Arg Arg Glu His Leu Val
 65 70 75 80

Leu Lys Val Ile Pro Ala Leu Lys Glu Gly Lys Val Val Leu Cys Asp
 85 90 95

Arg Tyr Ile Asp Ser Ser Leu Ala Tyr Gln Gly Tyr Ala Arg Gly Ile
 100 105 110

Gly Val Glu Glu Val Arg Ala Leu Asn Glu Phe Ala Ile Asn Gly Leu
 115 120 125

Tyr Pro Asp Leu Thr Ile Tyr Leu Asn Val Ser Ala Glu Val Gly Arg
 130 135 140

Glu Arg Ile Ile Lys Asn Ser Arg Asp Gln Asn Arg Leu Asp Gln Glu
 145 150 155 160

Asp Leu Lys Phe His Glu Lys Val Ile Glu Gly Tyr Gln Glu Ile Ile
 165 170 175

His Asn Glu Ser Gln Arg Phe Lys Ser Val Asn Ala Asp Gln Pro Leu
 180 185 190

Glu Asn Val Val Glu Asp Thr Tyr Gln Thr Ile Ile Lys Tyr Leu Glu
 195 200 205

Lys Ile
 210

<210> 170

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 170

gcggcgcccc atatgagtaa ggagttttat ataata

<210> 171
 <211> 35
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 171
 ggcgggatcc ttatactatt tcttcatggc tactc 35

<210> 172
 <211> 12
 <212> PRT
 <213> Staphylococcus aureus

<400> 172
 Arg Glu His Leu Val Leu Lys Val Ile Pro Ala Leu
 1 5 10

<210> 173
 <211> 10
 <212> PRT
 <213> Staphylococcus aureus

<400> 173
 Glu Gly Lys Val Val Leu Cys Asp Arg Tyr
 1 5 10

<210> 174
 <211> 15
 <212> PRT
 <213> Staphylococcus aureus

<400> 174
 Ile Asn Glu Val Tyr His Arg Leu Val Lys Asp Tyr Asp Val Ile
 1 5 10 15

<210> 175
 <211> 1077
 <212> DNA
 <213> Staphylococcus aureus

<400> 175
 gtgtttgatc aattagatat tgtagaagaa agatacgaac agttaaatga actgttaagt 60
 gaccagatg ttgtaaatga ttcagataaa ttacgtaaat attctaaaga gcaagctgat 120
 ttacaaaaaa ctgtagatgt ttatcgtaac tataaagcta aaaaagaaga attagctgat 180
 attgaagaaa tgttaagtga gactgatgat aaagaagaag tagaaatggt aaaagaggag 240
 agtaatggta ttaaagctga acttccaaat cttgaagaag agcttaaaat attattgatt 300
 ctaaagatc ctaatgatga caaagacggt attgtagaaa taagagcagc agcaggtggt 360
 gatgaggctg cgatttttgc tggtgattta atgcgtatgt attcaaagta tgctgaatca 420
 caaggattca aaactgaaat agtagaagcg tctgaaagtg accatggtgg ttacaaagaa 480
 attagtttct cagtttctgg taatggcgcg tatagtaaat tgaaatttga aaatggtgcg 540

```

caccgcgttc aacgtgtgcc tgaaacagaa tcaggtggac gtattcatac ttcaacagct 600
acagtggcag ttttaccaga agttgaagat gtagaaattg aaattagaaa tgaagattta 660
aaaatcgaca cgtatcggtc aagtgggtgca ggtgggtcagc acgtaaacac aactgactct 720
gcagtacgta ttacccattt accaactggt gtcattgcaa catcttctga gaagtctcaa 780
attcaaaacc gtgaaaaagc aatgaaagtg ttaaaagcac gtttatacga tatgaaagtt 840
caagaagaac aacaaaagta tgcgtcacaa cgtaaatacag cagtcggtac tggatgatcgt 900
tcagaacgta ttcgaactta taattatcca caaagccgtg taacagacca ttgtataggt 960
ctaacgcttc aaaaattagg gcaaattatg gaaggccatt tagaagaaat tatagatgca 1020
ctgactttat cagagcagac agataaattg aaagaactta ataatggtga attataa 1077

```

<210> 176

<211> 358

<212> PRT

<213> Staphylococcus aureus

<400> 176

```

Val Phe Asp Gln Leu Asp Ile Val Glu Glu Arg Tyr Glu Gln Leu Asn
  1              5              10              15

Glu Leu Leu Ser Asp Pro Asp Val Val Asn Asp Ser Asp Lys Leu Arg
      20              25              30

Lys Tyr Ser Lys Glu Gln Ala Asp Leu Gln Lys Thr Val Asp Val Tyr
      35              40              45

Arg Asn Tyr Lys Ala Lys Lys Glu Glu Leu Ala Asp Ile Glu Glu Met
      50              55              60

Leu Ser Glu Thr Asp Asp Lys Glu Glu Val Glu Met Leu Lys Glu Glu
      65              70              75              80

Ser Asn Gly Ile Lys Ala Glu Leu Pro Asn Leu Glu Glu Glu Leu Lys
      85              90              95

Ile Leu Leu Ile Pro Lys Asp Pro Asn Asp Asp Lys Asp Val Ile Val
      100             105             110

Glu Ile Arg Ala Ala Ala Gly Gly Asp Glu Ala Ala Ile Phe Ala Gly
      115             120             125

Asp Leu Met Arg Met Tyr Ser Lys Tyr Ala Glu Ser Gln Gly Phe Lys
      130             135             140

Thr Glu Ile Val Glu Ala Ser Glu Ser Asp His Gly Gly Tyr Lys Glu
      145             150             155             160

Ile Ser Phe Ser Val Ser Gly Asn Gly Ala Tyr Ser Lys Leu Lys Phe
      165             170             175

Glu Asn Gly Ala His Arg Val Gln Arg Val Pro Glu Thr Glu Ser Gly
      180             185             190

Gly Arg Ile His Thr Ser Thr Ala Thr Val Ala Val Leu Pro Glu Val
      195             200             205

Glu Asp Val Glu Ile Glu Ile Arg Asn Glu Asp Leu Lys Ile Asp Thr
      210             215             220

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Tyr Arg Ser Ser Gly Ala Gly Gly Gln His Val Asn Thr Thr Asp Ser
 225 230 235 240
 Ala Val Arg Ile Thr His Leu Pro Thr Gly Val Ile Ala Thr Ser Ser
 245 250 255
 Glu Lys Ser Gln Ile Gln Asn Arg Glu Lys Ala Met Lys Val Leu Lys
 260 265 270
 Ala Arg Leu Tyr Asp Met Lys Val Gln Glu Glu Gln Gln Lys Tyr Ala
 275 280 285
 Ser Gln Arg Lys Ser Ala Val Gly Thr Gly Asp Arg Ser Glu Arg Ile
 290 295 300
 Arg Thr Tyr Asn Tyr Pro Gln Ser Arg Val Thr Asp His Arg Ile Gly
 305 310 315 320
 Leu Thr Leu Gln Lys Leu Gly Gln Ile Met Glu Gly His Leu Glu Glu
 325 330 335
 Ile Ile Asp Ala Leu Thr Leu Ser Glu Gln Thr Asp Lys Leu Lys Glu
 340 345 350
 Leu Asn Asn Gly Glu Leu
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<210> 177

<211> 1077

<212> DNA

<213> *Staphylococcus aureus*

<400> 177

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ttacaaaaaa ctgtagatgt ttatcgtaac tataaagcta aaaaagaaga attagctgat 180
attgaagaaa tgtaaagtga gactgatgat aaagaagaag tagaaatgtt aaaagaggag 240
agtaatggta ttaaagctga acttccaaat cttgaagaag agcttaaaat attattgatt 300
cctaaagatc ctaatgatga caaagacggt attgtagaaa taagagcagc agcaggtggt 360
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caaggattca aaactgaaat agtagaagcg tctgaaagtg accatggtgg ttacaaagaa 480
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aaaatcgaca cgtatcggtc aagtgggtgca ggtgggtcagc acgtaaacac aactgactct 720
gcagtacgta ttacccattt accaactggt gtcattgcaa catcttctga gaagtctcaa 780
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caagaagaac aacaaaagta tgcgtcacaa cgtaaatcag cagtcggtac tggatgatcgt 900
tcagaacgta ttcgaactta taattatcca caaagccgtg taacagacca ttgtataggt 960
ctaacgcttc aaaaattagg gcaaattatg gaaggccatt tagaagaaat tatagatgca 1020
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<210> 178

<211> 358

<212> PRT

<213> Staphylococcus aureus

<400> 178

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Phe | Asp | Gln | Leu | Asp | Ile | Val | Glu | Glu | Arg | Tyr | Glu | Gln | Leu | Asn |
| 1 | | | | 5 | | | | 10 | | | | | | 15 | |
| Glu | Leu | Leu | Ser | Asp | Pro | Asp | Val | Val | Asn | Asp | Ser | Asp | Lys | Leu | Arg |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Lys | Tyr | Ser | Lys | Glu | Gln | Ala | Asp | Leu | Gln | Lys | Thr | Val | Asp | Val | Tyr |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Arg | Asn | Tyr | Lys | Ala | Lys | Lys | Glu | Glu | Leu | Ala | Asp | Ile | Glu | Glu | Met |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Leu | Ser | Glu | Thr | Asp | Asp | Lys | Glu | Glu | Val | Glu | Met | Leu | Lys | Glu | Glu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Ser | Asn | Gly | Ile | Lys | Ala | Glu | Leu | Pro | Asn | Leu | Glu | Glu | Glu | Leu | Lys |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Ile | Leu | Leu | Ile | Pro | Lys | Asp | Pro | Asn | Asp | Asp | Lys | Asp | Val | Ile | Val |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Glu | Ile | Arg | Ala | Ala | Ala | Gly | Gly | Asp | Glu | Ala | Ala | Ile | Phe | Ala | Gly |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Asp | Leu | Met | Arg | Met | Tyr | Ser | Lys | Tyr | Ala | Glu | Ser | Gln | Gly | Phe | Lys |
| | 130 | | | | | | 135 | | | | 140 | | | | |
| Thr | Glu | Ile | Val | Glu | Ala | Ser | Glu | Ser | Asp | His | Gly | Gly | Tyr | Lys | Glu |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Ile | Ser | Phe | Ser | Val | Ser | Gly | Asn | Gly | Ala | Tyr | Ser | Lys | Leu | Lys | Phe |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Glu | Asn | Gly | Ala | His | Arg | Val | Gln | Arg | Val | Pro | Glu | Thr | Glu | Ser | Gly |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Gly | Arg | Ile | His | Thr | Ser | Thr | Ala | Thr | Val | Ala | Val | Leu | Pro | Glu | Val |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Glu | Asp | Val | Glu | Ile | Glu | Ile | Arg | Asn | Glu | Asp | Leu | Lys | Ile | Asp | Thr |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Tyr | Arg | Ser | Ser | Gly | Ala | Gly | Gly | Gln | His | Val | Asn | Thr | Thr | Asp | Ser |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Ala | Val | Arg | Ile | Thr | His | Leu | Pro | Thr | Gly | Val | Ile | Ala | Thr | Ser | Ser |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Glu | Lys | Ser | Gln | Ile | Gln | Asn | Arg | Glu | Lys | Ala | Met | Lys | Val | Leu | Lys |
| | | | 260 | | | | | 265 | | | | | 270 | | |

Ala Arg Leu Tyr Asp Met Lys Val Gln Glu Glu Gln Gln Lys Tyr Ala
 275 280 285

Ser Gln Arg Lys Ser Ala Val Gly Thr Gly Asp Arg Ser Glu Arg Ile
 290 295 300

Arg Thr Tyr Asn Tyr Pro Gln Ser Arg Val Thr Asp His Cys Ile Gly
 305 310 315 320

Leu Thr Leu Gln Lys Leu Gly Gln Ile Met Glu Gly His Leu Glu Glu
 325 330 335

Ile Ile Asp Ala Leu Thr Leu Ser Glu Gln Thr Asp Lys Leu Lys Glu
 340 345 350

Leu Asn Asn Gly Glu Leu
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<210> 179
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

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34

<210> 180
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 180
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32

<210> 181
 <211> 18
 <212> PRT
 <213> Staphylococcus aureus

<400> 181
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 1 5 10 15

Ile Glu

<210> 182
 <211> 9
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 182
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 1 5

<210> 183
 <211> 7
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 183
 Met Lys Val Leu Lys Ala Arg
 1 5

<210> 184
 <211> 1290
 <212> DNA
 <213> *Streptococcus pneumoniae*

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 acgcctattt ttgagcatta cgaggttatc agtcgctctg tcggagatac aacggatata 180
 gtaaccaagg aaatgtacga tttttatgac aagggtgacc gtcataattac cctccgtcca 240
 gaaggaactg cacccggttg ccgttcctat gtggaaaata aacttttcgc cccagaagtg 300
 caaaagccaa gcaagttcta ctacatggga cctatgttcc gttatgagcg tccacaggca 360
 gggcgcttgc gccaatcca ccagattggg gttgagtgtt ttggctctag caatccagct 420
 accgatgtgg aaacaatcgc tatggcagcc cattttttga aggaaatcgg tattcaaggt 480
 gtcaaattgc acctcaacac tcttggaat cctgagagcc gtgcagccta ccgccaaagg 540
 ttgattgact atttgacacc gctcaaggag acctgttcta aggatagcca acgtcgcttg 600
 gaggaaaatc ctcttcgtgt cttggactct aaggaaaaag aagacaagggt ggcagtagag 660
 aatgcgccgt ctatcttgga ctttcttgat gaagaaagcc aagctcattt tgatgctgtg 720
 cgtcagatgt tggaaaatct tggagtagat tacatcatcg ataccaatat ggtgcgtggg 780
 ctggactact acaaccacac cattttcgag tttatcacag agattgaggg caatgacctg 840
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 gctggatttg gttttggact tgggtgtagag cgctgcttc tcatccttga aaagcaagg 960
 gtgacctcc ctatcgaaaa cgccctagat gtctatatcg cagtcttggg cgaaggggca 1020
 aatatcaagg ccttggaatt ggtacaggct cttcgccaac aaggtttcaa agcagagcgt 1080
 gattacctca accgtaaact aaaagctcag ttcaagtcag ccgatgtctt tgcggctaag 1140
 accctcatca ccctaggaga gagcgaagtc gaaagcggac aagtgcgggt caagaacaac 1200
 caaacccgag aagaagtgc agtgtcactt gagacaatca gccaaaactt ctcagaaatc 1260
 tttgaaaaac taggatttta tactcaataa 1290

<210> 185
 <211> 429
 <212> PRT
 <213> *Streptococcus pneumoniae*

<400> 185
 Met Lys Leu Gln Lys Pro Lys Gly Thr Gln Asp Ile Leu Pro Ala Glu
 1 5 10 15

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Ala | Lys | Trp | Gln | Tyr | Val | Glu | Gly | Phe | Ala | Arg | Glu | Ile | Phe | Lys | 20 | 25 | 30 | |
| Arg | Tyr | Asn | Tyr | Ala | Glu | Val | Arg | Thr | Pro | Ile | Phe | Glu | His | Tyr | Glu | 35 | 40 | 45 | |
| Val | Ile | Ser | Arg | Ser | Val | Gly | Asp | Thr | Thr | Asp | Ile | Val | Thr | Lys | Glu | 50 | 55 | 60 | |
| Met | Tyr | Asp | Phe | Tyr | Asp | Lys | Gly | Asp | Arg | His | Ile | Thr | Leu | Arg | Pro | 65 | 70 | 75 | 80 |
| Glu | Gly | Thr | Ala | Pro | Val | Val | Arg | Ser | Tyr | Val | Glu | Asn | Lys | Leu | Phe | 85 | 90 | 95 | |
| Ala | Pro | Glu | Val | Gln | Lys | Pro | Ser | Lys | Phe | Tyr | Tyr | Met | Gly | Pro | Met | 100 | 105 | 110 | |
| Phe | Arg | Tyr | Glu | Arg | Pro | Gln | Ala | Gly | Arg | Leu | Arg | Gln | Phe | His | Gln | 115 | 120 | 125 | |
| Ile | Gly | Val | Glu | Cys | Phe | Gly | Ser | Ser | Asn | Pro | Ala | Thr | Asp | Val | Glu | 130 | 135 | 140 | |
| Thr | Ile | Ala | Met | Ala | Ala | His | Phe | Leu | Lys | Glu | Ile | Gly | Ile | Gln | Gly | 145 | 150 | 155 | 160 |
| Val | Lys | Leu | His | Leu | Asn | Thr | Leu | Gly | Asn | Pro | Glu | Ser | Arg | Ala | Ala | 165 | 170 | 175 | |
| Tyr | Arg | Gln | Ala | Leu | Ile | Asp | Tyr | Leu | Thr | Pro | Leu | Lys | Glu | Thr | Leu | 180 | 185 | 190 | |
| Ser | Lys | Asp | Ser | Gln | Arg | Arg | Leu | Glu | Glu | Asn | Pro | Leu | Arg | Val | Leu | 195 | 200 | 205 | |
| Asp | Ser | Lys | Glu | Lys | Glu | Asp | Lys | Val | Ala | Val | Glu | Asn | Ala | Pro | Ser | 210 | 215 | 220 | |
| Ile | Leu | Asp | Phe | Leu | Asp | Glu | Glu | Ser | Gln | Ala | His | Phe | Asp | Ala | Val | 225 | 230 | 235 | 240 |
| Arg | Gln | Met | Leu | Glu | Asn | Leu | Gly | Val | Asp | Tyr | Ile | Ile | Asp | Thr | Asn | 245 | 250 | 255 | |
| Met | Val | Arg | Gly | Leu | Asp | Tyr | Tyr | Asn | His | Thr | Ile | Phe | Glu | Phe | Ile | 260 | 265 | 270 | |
| Thr | Glu | Ile | Glu | Gly | Asn | Asp | Leu | Thr | Val | Cys | Ala | Gly | Gly | Arg | Tyr | 275 | 280 | 285 | |
| Asp | Gly | Leu | Val | Ala | Tyr | Phe | Gly | Gly | Pro | Glu | Thr | Ala | Gly | Phe | Gly | 290 | 295 | 300 | |
| Phe | Gly | Leu | Gly | Val | Glu | Arg | Leu | Leu | Leu | Ile | Leu | Glu | Lys | Gln | Gly | 305 | 310 | 315 | 320 |

Val Thr Leu Pro Ile Glu Asn Ala Leu Asp Val Tyr Ile Ala Val Leu
 325 330 335

Gly Glu Gly Ala Asn Ile Lys Ala Leu Glu Leu Val Gln Ala Leu Arg
 340 345 350

Gln Gln Gly Phe Lys Ala Glu Arg Asp Tyr Leu Asn Arg Lys Leu Lys
 355 360 365

Ala Gln Phe Lys Ser Ala Asp Val Phe Ala Ala Lys Thr Leu Ile Thr
 370 375 380

Leu Gly Glu Ser Glu Val Glu Ser Gly Gln Val Thr Val Lys Asn Asn
 385 390 395 400

Gln Thr Arg Glu Glu Val Gln Val Ser Leu Glu Thr Ile Ser Gln Asn
 405 410 415

Phe Ser Glu Ile Phe Glu Lys Leu Gly Phe Tyr Thr Gln
 420 425

<210> 186

<211> 1290

<212> DNA

<213> Streptococcus pneumoniae

<400> 186

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acgcctattt ttgagcatta cgaggttatc agtcgctctg tcggagatac aacggatata 180
gtaaccaagg aaatgtacga tttttatgac aagggtgacc gtcataattac cctccgtcca 240
gaaggaaactg cggccgttgt ccgttcctat gtggaaaata aactcttcgc ccagaagtg 300
caaaagccaa gcaagttcta ctatatggga cctatgttcc gttatgagcg tccacaggca 360
gggcgccttg gccaattcca ccagattggt gttgagtgtt ttggctctag caatccagct 420
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cgtcagatgt tggaaaatct tggagtagac tacatcatcg ataccaatat ggtgcgtggt 780
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gattacctca accgtaagct caaagctcag ttcaagtcag ccgatgtctt tgcggctaag 1140
accctcatca ccctaggaga gagcgaagtc gaaagcgggc aagtgacggg caagaacaac 1200
caaaccgag aagaagtgca agtgtcactt gagacaatca gccaaaactt ctcaaaaatc 1260
tttgaaaaac taggatttta tactcaataa 1290

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<210> 187

<211> 429

<212> PRT

<213> Streptococcus pneumoniae

<400> 187

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Lys | Leu | Gln | Lys | Pro | Lys | Gly | Thr | Gln | Asp | Ile | Leu | Pro | Ala | Glu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Ser | Ala | Lys | Trp | Gln | Tyr | Val | Glu | Gly | Phe | Ala | Arg | Glu | Ile | Phe | Lys |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Arg | Tyr | Asn | Tyr | Ala | Glu | Val | Arg | Thr | Pro | Ile | Phe | Glu | His | Tyr | Glu |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Val | Ile | Ser | Arg | Ser | Val | Gly | Asp | Thr | Thr | Asp | Ile | Val | Thr | Lys | Glu |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Met | Tyr | Asp | Phe | Tyr | Asp | Lys | Gly | Asp | Arg | His | Ile | Thr | Leu | Arg | Pro |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Glu | Gly | Thr | Ala | Pro | Val | Val | Arg | Ser | Tyr | Val | Glu | Asn | Lys | Leu | Phe |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Ala | Pro | Glu | Val | Gln | Lys | Pro | Ser | Lys | Phe | Tyr | Tyr | Met | Gly | Pro | Met |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Phe | Arg | Tyr | Glu | Arg | Pro | Gln | Ala | Gly | Arg | Leu | Arg | Gln | Phe | His | Gln |
| | | 115 | | | | 120 | | | | | | 125 | | | |
| Ile | Gly | Val | Glu | Cys | Phe | Gly | Ser | Ser | Asn | Pro | Ala | Thr | Asp | Val | Glu |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Thr | Ile | Val | Met | Ala | Ala | His | Phe | Leu | Lys | Glu | Ile | Gly | Ile | Gln | Gly |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Val | Lys | Leu | His | Leu | Asn | Thr | Leu | Gly | Asn | Pro | Glu | Ser | Arg | Ala | Ala |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Tyr | Arg | Gln | Ala | Leu | Ile | Asp | Tyr | Leu | Thr | Pro | Leu | Lys | Glu | Thr | Leu |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Ser | Lys | Asp | Ser | Gln | Arg | Arg | Leu | Glu | Glu | Asn | Pro | Leu | Arg | Val | Leu |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Asp | Ser | Lys | Glu | Lys | Glu | Asp | Lys | Val | Ala | Val | Glu | Asn | Ala | Pro | Ser |
| | | 210 | | | | 215 | | | | | 220 | | | | |
| Ile | Leu | Asp | Phe | Leu | Asp | Glu | Glu | Ser | Gln | Ala | His | Phe | Asp | Ala | Val |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Arg | Gln | Met | Leu | Glu | Asn | Leu | Gly | Val | Asp | Tyr | Ile | Ile | Asp | Thr | Asn |
| | | | 245 | | | | | | 250 | | | | | 255 | |
| Met | Val | Arg | Gly | Leu | Asp | Tyr | Tyr | Asn | His | Thr | Ile | Phe | Glu | Phe | Ile |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Thr | Glu | Ile | Glu | Gly | Asn | Asp | Leu | Thr | Ile | Cys | Ala | Gly | Gly | Arg | Tyr |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Asp | Gly | Leu | Val | Ala | Tyr | Phe | Gly | Gly | Pro | Glu | Thr | Ala | Gly | Phe | Gly |
| | 290 | | | | | 295 | | | | | 300 | | | | |

Phe Gly Leu Gly Val Glu Arg Leu Leu Leu Ile Leu Glu Lys Gln Gly
 305 310 315 320

Val Ala Leu Pro Ile Glu Asn Ala Leu Asp Val Tyr Ile Ala Val Leu
 325 330 335

Gly Asp Gly Ala Asn Val Lys Ala Leu Glu Leu Val Gln Val Leu Arg
 340 345 350

Gln Gln Gly Phe Lys Ala Glu Arg Asp Tyr Leu Asn Arg Lys Leu Lys
 355 360 365

Ala Gln Phe Lys Ser Ala Asp Val Phe Ala Ala Lys Thr Leu Ile Thr
 370 375 380

Leu Gly Glu Ser Glu Val Glu Ser Gly Gln Val Thr Val Lys Asn Asn
 385 390 395 400

Gln Thr Arg Glu Glu Val Gln Val Ser Leu Glu Thr Ile Ser Gln Asn
 405 410 415

Phe Ser Glu Ile Phe Glu Lys Leu Gly Phe Tyr Thr Gln
 420 425

<210> 188

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 188

gcggcggccc atatgaaatt acaaaaacca aaagg

35

<210> 189

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 189

gcgcgatcc ttgagtataa aatcctagtt tttc

34

<210> 190

<211> 33

<212> PRT

<213> Streptococcus pneumoniae

<400> 190

Gly Leu Gly Val Glu Arg Leu Leu Leu Ile Leu Glu Lys Gln Gly Val
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Thr Leu Pro Ile Glu Asn Ala Leu Asp Val Tyr Ile Ala Val Leu Gly
 20 25 30

Glu

<210> 191

<211> 8

<212> PRT

<213> Streptococcus pneumoniae

<400> 191

Thr Ala Pro Val Val Arg Ser Tyr
 1 5

<210> 192

<211> 13

<212> PRT

<213> Streptococcus pneumoniae

<400> 192

Ile Lys Ala Leu Glu Leu Val Gln Ala Leu Arg Gln Gln
 1 5 10

<210> 193

<211> 936

<212> DNA

<213> Streptococcus pneumoniae

<400> 193

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 aataccctct atctagcttc ctatcaaaca gcaggccgag gccgttttca acgttccctc 360
 tactcaccac aaggtggtat ttatatgaca ctccatctta aaccaaactc cccctatgac 420
 aaattaccat cctacacact acttgtagct ggagctgtct acaaagccat taagaacct 480
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 gccagcttat ttaaagctac agctcctata acaaggaatg aattgatcat agaaatctgg 720
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 attctaggaa aagaagtcac ttccacacta gagcaaaaag actacaaggg acttgctaaa 840
 gacatctcag aaaatggaaa acttttagtt caatgtgata acggaaaaga aatctggcta 900
 aatagtggcg aaatttctct caatagttgg aagtaa 936

Lys Asp Tyr Lys Gly Leu Ala Lys Asp Ile Ser Glu Asn Gly Lys Leu
 275 280 285

Leu Val Gln Cys Asp Asn Gly Lys Glu Ile Trp Leu Asn Ser Gly Glu
 290 295 300

Ile Ser Leu Asn Ser Trp Lys
 305 310

<210> 195

<211> 936

<212> DNA

<213> Streptococcus pneumoniae

<400> 195

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atgaaatcct accaagctgt ctaccaaact ctatctaaag aaaccgacta tatcagcggg 60
gaaaaaatcg cagaaaaaact atccctaagc cgaacagcaa tttggaaagc catcaagcga 120
ctagaacaag aaggcattga aattgatagt atcaaaaata gaggatataa actgatgaat 180
ggtgacctta ttcttcaga gattctagaa gaaaatcttc caattaaagt cagctttaaa 240
cccgaaacaa aatcaacaca actagatgca aaagaagcaa ttgatttagg ccatgaagca 300
aataccctct atctagcttc ctatcaaaca gcaggccgag gccgttttca acgttccttc 360
tactcaccac aaggtggtat ttatatgaca ctccatctta aaccaaactc cccctatgac 420
aaattaccat cctacacact acttgtagct ggagctgtct acaaagccat taagaacct 480
actttaatag atgtcgacat aaaatgggtc aatgatattc atctaaacaa tcataaaatt 540
ggaggaatcc ttactgaagc aatgacctct gtagaaactg gcttagtcac agatatcatt 600
attggagtag gtatcaattt cactattaaa gacttccttc aggaattaaa agaaaaagct 660
gccagcttat ttaaagctac agctcctata acaaggaatg aattgatcat agaaatctgg 720
cgtactttct tcgaaacacc agcagaagag ctattatacc tatacaaaaa acagtcattc 780
attctaggaa aagaagtcac ttccacacta gagcaaaaag actacaaggg acttgctaaa 840
gacatctcag aaaatggaaa acttttagtt caatgtgata acggaaaaga aatctggcta 900
aatagtggcg aaatttctct caatagttag aagtaa 936

```

<210> 196

<211> 311

<212> PRT

<213> Streptococcus pneumoniae

<400> 196

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Met Lys Ser Tyr Gln Ala Val Tyr Gln Ile Leu Ser Lys Glu Thr Asp
  1           5           10           15

Tyr Ile Ser Gly Glu Lys Ile Ala Glu Lys Leu Ser Leu Ser Arg Thr
      20           25           30

Ala Ile Trp Lys Ala Ile Lys Arg Leu Glu Gln Glu Gly Ile Glu Ile
      35           40           45

Asp Ser Ile Lys Asn Arg Gly Tyr Lys Leu Met Asn Gly Asp Leu Ile
      50           55           60

Leu Pro Glu Ile Leu Glu Glu Asn Leu Pro Ile Lys Val Ser Phe Lys
      65           70           75           80

Pro Glu Thr Lys Ser Thr Gln Leu Asp Ala Lys Glu Ala Ile Asp Leu
      85           90           95

```

Gly His Glu Ala Asn Thr Leu Tyr Leu Ala Ser Tyr Gln Thr Ala Gly
 100 105 110
 Arg Gly Arg Phe Gln Arg Ser Phe Tyr Ser Pro Gln Gly Gly Ile Tyr
 115 120 125
 Met Thr Leu His Leu Lys Pro Asn Leu Pro Tyr Asp Lys Leu Pro Ser
 130 135 140
 Tyr Thr Leu Leu Val Ala Gly Ala Val Tyr Lys Ala Ile Lys Asn Leu
 145 150 155 160
 Thr Leu Ile Asp Val Asp Ile Lys Trp Val Asn Asp Ile Tyr Leu Asn
 165 170 175
 Asn His Lys Ile Gly Gly Ile Leu Thr Glu Ala Met Thr Ser Val Glu
 180 185 190
 Thr Gly Leu Val Thr Asp Ile Ile Ile Gly Val Gly Ile Asn Phe Thr
 195 200 205
 Ile Lys Asp Phe Pro Gln Glu Leu Lys Glu Lys Ala Ala Ser Leu Phe
 210 215 220
 Lys Ala Thr Ala Pro Ile Thr Arg Asn Glu Leu Ile Ile Glu Ile Trp
 225 230 235 240
 Arg Thr Phe Phe Glu Thr Pro Ala Glu Glu Leu Leu Tyr Leu Tyr Lys
 245 250 255
 Lys Gln Ser Phe Ile Leu Gly Lys Glu Val Thr Phe Thr Leu Glu Gln
 260 265 270
 Lys Asp Tyr Lys Gly Leu Ala Lys Asp Ile Ser Glu Asn Gly Lys Leu
 275 280 285
 Leu Val Gln Cys Asp Asn Gly Lys Glu Ile Trp Leu Asn Ser Gly Glu
 290 295 300
 Ile Ser Leu Asn Ser Trp Lys
 305 310

<210> 197

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 197

gcggcggccc atatgaaatc ctaccaagct gtc

<210> 198
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 198
 gcgcggatcc cttccaacta ttgagagaaa tttc

34

<210> 199
 <211> 41
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 199
 Tyr Met Thr Leu His Leu Lys Pro Asn Leu Pro Tyr Asp Lys Leu Pro
 1 5 10 15
 Ser Tyr Thr Leu Leu Val Ala Gly Ala Val Tyr Lys Ala Ile Lys Asn
 20 25 30
 Leu Thr Leu Ile Asp Val Asp Ile Lys
 35 40

<210> 200
 <211> 7
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 200
 Lys Leu Leu Val Gln Cys Asp
 1 5

<210> 201
 <211> 9
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 201
 Tyr Gln Ala Val Tyr Gln Ile Leu Ser
 1 5

<210> 202
 <211> 1077
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 202
 atgggatata cagttgctgt agtcggcgcg acaggtgctg tcggtgctca gatgataaaa 60
 atgttggaag aatcaacact tccaatcgat aaaattcggt accttgcttc tgcacgttca 120
 gcaggttaagt cattgaaatt taaagatcaa gatattacaa ttgaagaaac gactgaaaca 180

```

gcttttgaag gagttgatat tgctctcttt tcagcaggta gttctacatc agctaagtat 240
gcaccatacg cagtaaaagc tggcgtggta gtagtagata atacatctta tttccgtcaa 300
aatccagatg ttcctttggg tggtccagag gtcaatgctc atgcacttga tgctcacaac 360
ggaatcattg cctgccctaa ttgttcaaca attcaaatga tgggtggtct tgagccggtt 420
cgccaaaaat ggggcttgga ccgtatcatt gtttcaactt atcaagccgt ttcaggtgct 480
ggatatgggag caattcttga gacacaacgt gaacttcgtg aagtcttgaa tgatgggtgtg 540
aaaccacgtg atttgcattg ggaaatcttg ccttcagggtg gtgacaagaa acattatcct 600
atcgcccttta acgctcttcc acaaattgat gttttcactg ataatgatta cacgtacgaa 660
gagatgaaga tgaccaagga aactaagaaa attatggaag atgatagcat tgcagtatct 720
gcaacatgtg tgcgtattcc agtcttgtca gctcactctg agtctgttta tatcgaaaca 780
aaagaagtgg ctccaatcga agaagtaaaa gcagctatcg cagccttccc aggtgctgtt 840
cttgaagatg atgtagctca tcaaattctat cctcaagcta tcaatgcagt tggttcgcgt 900
gatacctttg ttggtcgtat ccgtaaagac ttggatgcag aaaaaggaat tcacatgtgg 960
gttgtttcag ataaccttct caaaggtgct gcttggaaact cagttcagat tgctgaaact 1020
cttcatgaac gtggattggg tcgtccaaca gccgaattga aatttgaatt aaaatag 1077

```

<210> 203

<211> 358

<212> PRT

<213> Streptococcus pneumoniae

<400> 203

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Met Gly Tyr Thr Val Ala Val Val Gly Ala Thr Gly Ala Val Gly Ala
  1              5              10              15

Gln Met Ile Lys Met Leu Glu Glu Ser Thr Leu Pro Ile Asp Lys Ile
      20              25              30

Arg Tyr Leu Ala Ser Ala Arg Ser Ala Gly Lys Ser Leu Lys Phe Lys
      35              40              45

Asp Gln Asp Ile Thr Ile Glu Glu Thr Thr Glu Thr Ala Phe Glu Gly
      50              55              60

Val Asp Ile Ala Leu Phe Ser Ala Gly Ser Ser Thr Ser Ala Lys Tyr
      65              70              75              80

Ala Pro Tyr Ala Val Lys Ala Gly Val Val Val Val Asp Asn Thr Ser
      85              90              95

Tyr Phe Arg Gln Asn Pro Asp Val Pro Leu Val Val Pro Glu Val Asn
      100             105             110

Ala His Ala Leu Asp Ala His Asn Gly Ile Ile Ala Cys Pro Asn Cys
      115             120             125

Ser Thr Ile Gln Met Met Val Ala Leu Glu Pro Val Arg Gln Lys Trp
      130             135             140

Gly Leu Asp Arg Ile Ile Val Ser Thr Tyr Gln Ala Val Ser Gly Ala
      145             150             155             160

Gly Met Gly Ala Ile Leu Glu Thr Gln Arg Glu Leu Arg Glu Val Leu
      165             170             175

Asn Asp Gly Val Lys Pro Arg Asp Leu His Ala Glu Ile Leu Pro Ser
      180             185             190

```

Gly Gly Asp Lys Lys His Tyr Pro Ile Ala Phe Asn Ala Leu Pro Gln
 195 200 205
 Ile Asp Val Phe Thr Asp Asn Asp Tyr Thr Tyr Glu Glu Met Lys Met
 210 215 220
 Thr Lys Glu Thr Lys Lys Ile Met Glu Asp Asp Ser Ile Ala Val Ser
 225 230 235 240
 Ala Thr Cys Val Arg Ile Pro Val Leu Ser Ala His Ser Glu Ser Val
 245 250 255
 Tyr Ile Glu Thr Lys Glu Val Ala Pro Ile Glu Glu Val Lys Ala Ala
 260 265 270
 Ile Ala Ala Phe Pro Gly Ala Val Leu Glu Asp Asp Val Ala His Gln
 275 280 285
 Ile Tyr Pro Gln Ala Ile Asn Ala Val Gly Ser Arg Asp Thr Phe Val
 290 295 300
 Gly Arg Ile Arg Lys Asp Leu Asp Ala Glu Lys Gly Ile His Met Trp
 305 310 315 320
 Val Val Ser Asp Asn Leu Leu Lys Gly Ala Ala Trp Asn Ser Val Gln
 325 330 335
 Ile Ala Glu Thr Leu His Glu Arg Gly Leu Val Arg Pro Thr Ala Glu
 340 345 350
 Leu Lys Phe Glu Leu Lys
 355

<210> 204
 <211> 1077
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 204
 atgggatata cagttgctgt agtcggcgcg acaggtgctg tcggtgctca gatgataaaa 60
 atggttgaag aatcaacact tccaattgat aaaatccgtt accttgcttc tgcacgttca 120
 gcaggtgaag cattgaaatt taaagatcaa gatattacga ttgaagaaac gactgaaaca 180
 gcttttgaag gagttgatat tgctctcttt tcagcaggtg attcgacatc agctaagtat 240
 gcaccatacg cagtaaaagc tggcgtggta gtagtggata atacatctta tttccgtcaa 300
 aatccagatg ttcctttggg tggtccagag gtcaatgctc atgcacttga tgcccacaac 360
 ggaatcattg cctgcccctaa ctgttcaaca atccaaatga tgggtggctct tgagccgggt 420
 cgccaaaaat ggggcttgga ccgtatcatt gtttcaactt atcaagccgt ttcaggtgct 480
 ggtatgggag caattcttga gacacaacgt gaacttcgtg aagtcttgaa tgatgggtgtg 540
 aaaccacgtg atttgcatgc ggaaatctta ccttcaggcg gtgacaagaa acattatcct 600
 atcgccctca atgctcttcc acaaatcgat gtcttcaactg acaatgatta cacttacgaa 660
 gagatgaaga tgaccaagga aactaagaaa attatggaag atgatagcat tgcagtatct 720
 gcaacatgtg tacgtattcc agtcttgtca gctcactctg agtctgttta tatcgaaaca 780
 aaagaagtgg ctccaatcga agaagtaaaa gcagctatcg cagccttccc aggtgctgtt 840
 cttgaagatg atgtagctca tcaaattctat cctcaagcta tcaatgcagt tgggtcgcgt 900
 gatacctttg ttggtcgtat ccgtaaagac ttggatgcag aaaaaggaat tcacatgtgg 960
 gttgtttcag ataaccttct caaaggtgct gcttggaaact cagttcagat tgctgaaact 1020

1077

<211> 358

<213> Streptococcus pneumoniae

<400> 205

Ala Thr Cys Val Arg Ile Pro Val Leu Ser Ala His Ser Glu Ser Val
245 250 255

Tyr Ile Glu Thr Lys Glu Val Ala Pro Ile Glu Glu Val Lys Ala Ala
 260 265 270
 Ile Ala Ala Phe Pro Gly Ala Val Leu Glu Asp Asp Val Ala His Gln
 275 280 285
 Ile Tyr Pro Gln Ala Ile Asn Ala Val Gly Ser Arg Asp Thr Phe Val
 290 295 300
 Gly Arg Ile Arg Lys Asp Leu Asp Ala Glu Lys Gly Ile His Met Trp
 305 310 315 320
 Val Val Ser Asp Asn Leu Leu Lys Gly Ala Ala Trp Asn Ser Val Gln
 325 330 335
 Ile Ala Glu Thr Leu His Glu Arg Gly Leu Val Arg Pro Thr Ala Glu
 340 345 350
 Leu Lys Phe Glu Leu Lys
 355

<210> 206
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 206
 gcggcgcccc atatgggata tacagttgct gtag

34

<210> 207
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 207
 gcgcgatcc ttttaattca aatttcaatt cggc

34

<210> 208
 <211> 62
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 208
 Ser Ile Ala Val Ser Ala Thr Cys Val Arg Ile Pro Val Leu Ser Ala
 1 5 10 15

His Ser Glu Ser Val Tyr Ile Glu Thr Lys Glu Val Ala Pro Ile Glu
 20 25 30

Glu Val Lys Ala Ala Ile Ala Ala Phe Pro Gly Ala Val Leu Glu Asp
 35 40 45

Asp Val Ala His Gln Ile Tyr Pro Gln Ala Ile Asn Ala Val
 50 55 60

<210> 209

<211> 19

<212> PRT

<213> Streptococcus pneumoniae

<400> 209

Ser Ala Lys Tyr Ala Pro Tyr Ala Val Lys Ala Gly Val Val Val Val
 1 5 10 15

Asp Asn Thr

<210> 210

<211> 17

<212> PRT

<213> Streptococcus pneumoniae

<400> 210

Asn Pro Asp Val Pro Leu Val Val Pro Glu Val Asn Ala His Ala Leu
 1 5 10 15

Asp

<210> 211

<211> 519

<212> DNA

<213> Staphylococcus aureus

<400> 211

| | | | | | | |
|------------|------------|------------|------------|-------------|-------------|-----|
| atggatttaa | agcaatacgt | atcagaagtt | caagattggc | cgaaaccagg | tgtagtttc | 60 |
| aaggatatta | ctacaattat | ggataatggg | gaagcatatg | gctatgcaac | agataaaatt | 120 |
| gtagaatacg | caaaagacag | agatgttgat | atcgttgtag | gacctgaagc | gcgtggcttt | 180 |
| atcattggct | gtcctgtagc | ttattcaatg | gggattggct | ttgcacctgt | tagaaaagaa | 240 |
| gggaaattac | ctcgtgaagt | cattcgttat | gagtatgacc | tagaatatgg | tacaaatggt | 300 |
| ttaacaatgc | acaaagatgc | aattaaacca | ggtcaacgtg | tgtaattac | agatgattta | 360 |
| ttagctactg | gtggtacgat | tgaagcagca | ataaaattag | ttgaaaaatt | aggcgggtatc | 420 |
| gtagtaggta | ttgcatttat | aattgaattg | aaatatttaa | atgggtattga | aaaaattaaa | 480 |
| gattacgatg | ttatgagttt | aatctcatac | gacgaataa | | | 519 |

<210> 212

<211> 172

<212> PRT

<213> Staphylococcus aureus

<400> 212

```

Met Asp Leu Lys Gln Tyr Val Ser Glu Val Gln Asp Trp Pro Lys Pro
 1          5          10          15

Gly Val Ser Phe Lys Asp Ile Thr Thr Ile Met Asp Asn Gly Glu Ala
          20          25          30

Tyr Gly Tyr Ala Thr Asp Lys Ile Val Glu Tyr Ala Lys Asp Arg Asp
          35          40          45

Val Asp Ile Val Val Gly Pro Glu Ala Arg Gly Phe Ile Ile Gly Cys
          50          55          60

Pro Val Ala Tyr Ser Met Gly Ile Gly Phe Ala Pro Val Arg Lys Glu
          65          70          75          80

Gly Lys Leu Pro Arg Glu Val Ile Arg Tyr Glu Tyr Asp Leu Glu Tyr
          85          90          95

Gly Thr Asn Val Leu Thr Met His Lys Asp Ala Ile Lys Pro Gly Gln
          100          105          110

Arg Val Leu Ile Thr Asp Asp Leu Leu Ala Thr Gly Gly Thr Ile Glu
          115          120          125

Ala Ala Ile Lys Leu Val Glu Lys Leu Gly Gly Ile Val Val Gly Ile
          130          135          140

Ala Phe Ile Ile Glu Leu Lys Tyr Leu Asn Gly Ile Glu Lys Ile Lys
          145          150          155          160

Asp Tyr Asp Val Met Ser Leu Ile Ser Tyr Asp Glu
          165          170

```

<210> 213

<211> 519

<212> DNA

<213> Staphylococcus aureus

<400> 213

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atggatttaa agcaatacgt atcagaagtt caagattggc cgaaaccagg tgttagtttc 60
aaggatatta ctacaattat ggataatggg gaagcatatg gctatgcaac agataaaatt 120
gtagaatacgc caaaagacag agatgttgat atcgttgtag gacctgaagc gcgtggcttt 180
atcattggct gtcctgtagc ttattcaatg gggattggct ttgcacctgt tagaaaagaa 240
gggaaattac ctcgtgaagt cattcgttat gagtatgacc tagaatatgg tacaaatggt 300
ttaacaatgc acaaagatgc aattaaacca ggtcaacgtg tgtaattac agatgattta 360
ttagctactg gtggtacgat tgaagcagca ataaaattag ttgaaaaatt aggcgggtatc 420
gtagtaggta ttgcatttat aattgaattg aaatatttaa atgggtattga aaaaattaaa 480
gattacgatg ttatgagttt aatctcatac gacgaataa 519

```

<210> 214

<211> 172

<212> PRT

<213> Staphylococcus aureus

<400> 214

```

Met Asp Leu Lys Gln Tyr Val Ser Glu Val Gln Asp Trp Pro Lys Pro
 1              5              10              15

Gly Val Ser Phe Lys Asp Ile Thr Thr Ile Met Asp Asn Gly Glu Ala
      20              25              30

Tyr Gly Tyr Ala Thr Asp Lys Ile Val Glu Tyr Ala Lys Asp Arg Asp
      35              40              45

Val Asp Ile Val Val Gly Pro Glu Ala Arg Gly Phe Ile Ile Gly Cys
      50              55              60

Pro Val Ala Tyr Ser Met Gly Ile Gly Phe Ala Pro Val Arg Lys Glu
      65              70              75              80

Gly Lys Leu Pro Arg Glu Val Ile Arg Tyr Glu Tyr Asp Leu Glu Tyr
      85              90              95

Gly Thr Asn Val Leu Thr Met His Lys Asp Ala Ile Lys Pro Gly Gln
      100             105             110

Arg Val Leu Ile Thr Asp Asp Leu Leu Ala Thr Gly Gly Thr Ile Glu
      115             120             125

Ala Ala Ile Lys Leu Val Glu Lys Leu Gly Gly Ile Val Val Gly Ile
      130             135             140

Ala Phe Ile Ile Glu Leu Lys Tyr Leu Asn Gly Ile Glu Lys Ile Lys
      145             150             155             160

Asp Tyr Asp Val Met Ser Leu Ile Ser Tyr Asp Glu
      165             170

```

<210> 215

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 215

gcggcgcat taatatggat ttaaagcaat acgtatc

37

<210> 216

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 216
gcgcggatcc ttcgtcgtat gagattaaac tc 32

<210> 217
<211> 11
<212> PRT
<213> Staphylococcus aureus

<400> 217
Gly Phe Ile Ile Gly Cys Pro Val Ala Tyr Ser
1 5 10

<210> 218
<211> 7
<212> PRT
<213> Staphylococcus aureus

<400> 218
Val Asp Ile Val Val Gly Pro
1 5

<210> 219
<211> 26
<212> PRT
<213> Staphylococcus aureus

<400> 219
Glu Ala Ala Ile Lys Leu Val Glu Lys Leu Gly Gly Ile Val Val Gly
1 5 10 15

Ile Ala Phe Ile Ile Glu Leu Lys Tyr Leu
20 25

<210> 220
<211> 777
<212> DNA
<213> Staphylococcus aureus

<400> 220
gtgtcttctt tacttgtata tgttacatat attcacgata gagaggataa gaaaatggct 60
caaatttcta aatataaacg tgtagttttg aaactaagtg gtgaagcgtt agctggagaa 120
aaaggatttg gcataaatcc agtaattatt aaaagtgttg ctgagcaagt ggctgaagtt 180
gctaaaatgg actgtgaaat cgcagtaatc gttgggtggcg gaaacatttg gagaggtaaa 240
acaggtagtg acttaggtat ggaccgtgga actgctgatt acatgggtat gcttgcaact 300
gtaatgaatg ccttagcatt acaagatagt ttagaacaat tggatttgtga tacacgagta 360
ttaacatcta ttgaaatgaa gcaagtggct gaaccttata ttcgtcgtcg tgcaattaga 420
cacttagaaa agaaacgcgt agttatTTTT gctgcaggta ttggaaaccc atacttctct 480
acagatacta cagcggcatt acgtgctgca gaagttgaag cagatgttat tttaatgggc 540
aaaaataatg tagatgggtg atattctgca gatcctaag taaacaaaga tgcggtaaaa 600
tatgaacatt taacgcata tcaaagtctt caagaagggt tacaagtaat ggattcaaca 660
gcatacctcat tctgtatgga taataacatt ccgttaactg ttttctctat tatggaagaa 720
ggaaatatta aacgtgctgt tatgggtgaa aagataggta cgttaattac aaaataa 777

```
<210> 221
<211> 258
<212> PRT
<213> Staphylococcus aureus
```

[illegible]

<210> 222
 <211> 777
 <212> DNA
 <213> *Staphylococcus aureus*

<400> 222
 gtgtcttctt tacttgtata tgttacatat attcacgata gagaggataa gaaaatggct 60
 caaatttcta aatataaacg tgtagttttg aaactaagtg gtgaagcgtt agctggagaa 120
 aaaggatttg gcataaatcc agtaattatt aaaagtgttg ctgagcaagt ggctgaagtt 180
 gctaaaatgg actgtgaaat cgcagtaatc gttggtggcg gaaacatttg gagaggtaaa 240
 ccaggtagtg acttaggtat ggaccgtgga actgctgatt acatgggtat gcttgcaact 300
 gtaatgaatg ctttagcatt acaagatagt ttagaacaat tggattgtga tacacgagta 360
 ttaacatcta ttgaaatgaa gcaagtggct gaaccttata ttcgtcgtcg tgcaattaga 420
 cacttagaaa agaaacgcgt agttattttt gctgcaggta ttggaaaccc atacttctct 480
 acagatacta cagcggcatt acgtgctgca gaagttgaag cagatgttat tttaatgggc 540
 aaaaataatg tagatgggtg atattctgca gacctaag taaacaaaga tgcggtaaaa 600
 tatgaacatt taacgcata tcaaagtctt caagaaggtt tacaagtaat ggattcaaca 660
 gcatacctcat tctgtatgga taataacatt ccgttaactg ttttctctat tatggaagaa 720
 ggaaatatta aacgtgctgt tatgggtgaa aagataggta cgttaattac aaaataa 777

<210> 223
 <211> 258
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 223
 Val Ser Ser Leu Leu Val Tyr Val Thr Tyr Ile His Asp Arg Glu Asp
 1 5 10 15
 Lys Lys Met Ala Gln Ile Ser Lys Tyr Lys Arg Val Val Leu Lys Leu
 20 25 30
 Ser Gly Glu Ala Leu Ala Gly Glu Lys Gly Phe Gly Ile Asn Pro Val
 35 40 45
 Ile Ile Lys Ser Val Ala Glu Gln Val Ala Glu Val Ala Lys Met Asp
 50 55 60
 Cys Glu Ile Ala Val Ile Val Gly Gly Gly Asn Ile Trp Arg Gly Lys
 65 70 75 80
 Pro Gly Ser Asp Leu Gly Met Asp Arg Gly Thr Ala Asp Tyr Met Gly
 85 90 95
 Met Leu Ala Thr Val Met Asn Ala Leu Ala Leu Gln Asp Ser Leu Glu
 100 105 110
 Gln Leu Asp Cys Asp Thr Arg Val Leu Thr Ser Ile Glu Met Lys Gln
 115 120 125
 Val Ala Glu Pro Tyr Ile Arg Arg Arg Ala Ile Arg His Leu Glu Lys
 130 135 140
 Lys Arg Val Val Ile Phe Ala Ala Gly Ile Gly Asn Pro Tyr Phe Ser
 145 150 155 160

108

Thr Asp Thr Thr Ala Ala Leu Arg Ala Ala Glu Val Glu Ala Asp Val
165 170 175
Ile Leu Met Gly Lys Asn Asn Val Asp Gly Val Tyr Ser Ala Asp Pro
180 185 190
Lys Val Asn Lys Asp Ala Val Lys Tyr Glu His Leu Thr His Ile Gln
195 200 205
Met Leu Gln Glu Gly Leu Gln Val Met Asp Ser Thr Ala Ser Ser Phe
210 215 220
Cys Met Asp Asn Asn Ile Pro Leu Thr Val Phe Ser Ile Met Glu Glu
225 230 235 240
Gly Asn Ile Lys Arg Ala Val Met Gly Glu Lys Ile Gly Thr Leu Ile
245 250 255

Thr Lys

<210> 224

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
primer

<400> 224

gcggcgccc atatgtcttc tttacttgta tatgttac

38

<210> 225

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
primer

<400> 225

gcgcgatcc ttttgtaatt aacgtaccta tcttttc

37

<210> 226

<211> 8

<212> PRT

<213> Staphylococcus aureus

<400> 226

Leu Leu Val Tyr Val Thr Tyr Ile

1

5

<210> 227
 <211> 12
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 227
 Lys Met Asp Cys Glu Ile Ala Val Ile Val Gly Gly
 1 5 10

<210> 228
 <211> 14
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 228
 Ile Ser Lys Tyr Lys Arg Val Val Leu Lys Leu Ser Gly Glu
 1 5 10

<210> 229
 <211> 627
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 229
 atggcagacc gaggttact aatcgttttt tctggtcctt caggggttgg aaaaggaacg 60
 gttagaagag agatttttga gagttctgaa aaccaatttc aatattctgt atcgatgacg 120
 acacgcgcac aacgtcctgg agaagtggac ggtgttgact atttcttccg tactcgtgaa 180
 gaatttgaag agctgattcg tcaaggacag atggttggat acgcagaata tgcggtaac 240
 tactatggaa ctccctctgac ctatgtcaat gaaaccttgg acaaggggaat cgatgttttc 300
 cttgaaattg aagttcaggg tgctcttcag gtcaagaaaa aggttccaga tgctgtcttt 360
 atcttcctga caccaccaga tttggatgaa ttgcaagatc gcttggtagg tctggaaca 420
 gatagtgcag aagtgtattgc ccaacgaatc gaaaaggcca aggaagaaat tgccctcatg 480
 cgtgagtatg attatgcgat tgtcaacgat caggtacccc tagctgctga acgtgtcaaa 540
 tgtgtgattg aagcagaaca cttctgtgtg gatcgtgtca ttggtcacta tcaggagatg 600
 ttaccaaaat ctccaactac ccgataa 627

<210> 230
 <211> 208
 <212> PRT
 <213> *Streptococcus pneumoniae*

<400> 230
 Met Ala Asp Arg Gly Leu Leu Ile Val Phe Ser Gly Pro Ser Gly Val
 1 5 10 15

 Gly Lys Gly Thr Val Arg Arg Glu Ile Phe Glu Ser Ser Glu Asn Gln
 20 25 30

 Phe Gln Tyr Ser Val Ser Met Thr Thr Arg Ala Gln Arg Pro Gly Glu
 35 40 45

 Val Asp Gly Val Asp Tyr Phe Phe Arg Thr Arg Glu Glu Phe Glu Glu
 50 55 60

110

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Leu | Ile | Arg | Gln | Gly | Gln | Met | Leu | Glu | Tyr | Ala | Glu | Tyr | Val | Gly | Asn | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Tyr | Tyr | Gly | Thr | Pro | Leu | Thr | Tyr | Val | Asn | Glu | Thr | Leu | Asp | Lys | Gly | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| Ile | Asp | Val | Phe | Leu | Glu | Ile | Glu | Val | Gln | Gly | Ala | Leu | Gln | Val | Lys | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Lys | Lys | Val | Pro | Asp | Ala | Val | Phe | Ile | Phe | Leu | Thr | Pro | Pro | Asp | Leu | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Asp | Glu | Leu | Gln | Asp | Arg | Leu | Val | Gly | Arg | Gly | Thr | Asp | Ser | Ala | Glu | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |
| Val | Ile | Ala | Gln | Arg | Ile | Glu | Lys | Ala | Lys | Glu | Glu | Ile | Ala | Leu | Met | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| Arg | Glu | Tyr | Asp | Tyr | Ala | Ile | Val | Asn | Asp | Gln | Val | Pro | Leu | Ala | Ala | |
| | | | | 165 | | | | | 170 | | | | | | 175 | |
| Glu | Arg | Val | Lys | Cys | Val | Ile | Glu | Ala | Glu | His | Phe | Cys | Val | Asp | Arg | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Val | Ile | Gly | His | Tyr | Gln | Glu | Met | Leu | Pro | Lys | Ser | Pro | Thr | Thr | Arg | |
| | 195 | | | | | | 200 | | | | | | 205 | | | |

<210> 231
 <211> 627
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 231
 atggcagacc gaggtctact aatcggtttt tctggtcctt caggggttgg aaaaggaacg 60
 gttagaagag agatttttga gagttctgaa aaccaatttc aatactctgt atcgatgacg 120
 acacgcgcac aacgtcctgg agaagtggac ggtgttgact atttcttccg tactcgtgaa 180
 gaatttgaag agctgattcg tcaaggacag atgttggaa acgcagaata tgtcggcaac 240
 tactatggaa ctctctgac ctatgtcaat gaaaccttgg acaaggggaat cgatgttttc 300
 cttgaaattg aagttcaggg tgctcttcag gtcaagaaaa aggttccaga tgctgtcttt 360
 atcttcctga caccaccaga tttggatgaa ttgcaagatc gcttggtagg tcgtggaaca 420
 gatagtgcag aagtgattgc ccaacgaatc gaaaaggcca aggaagaaat tgccctcatg 480
 cgtgagtatg attatgcgat tgtcaacgat caggtacccc tagctgctga acgtgtcaaa 540
 tgtgtgattg aagcagaaca cttctgtgtg gatcgtgtca ttggtcacta tcaggagatg 600
 ttaccaaaat ctccaactac ccgataa 627

<210> 232
 <211> 208
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 232
 Met Ala Asp Arg Gly Leu Leu Ile Val Phe Ser Gly Pro Ser Gly Val
 1 5 10 15

Gly Lys Gly Thr Val Arg Arg Glu Ile Phe Glu Ser Ser Glu Asn Gln
 20 25 30
 Phe Gln Tyr Ser Val Ser Met Thr Thr Arg Ala Gln Arg Pro Gly Glu
 35 40 45
 Val Asp Gly Val Asp Tyr Phe Phe Arg Thr Arg Glu Glu Phe Glu Glu
 50 55 60
 Leu Ile Arg Gln Gly Gln Met Leu Glu Tyr Ala Glu Tyr Val Gly Asn
 65 70 75 80
 Tyr Tyr Gly Thr Pro Leu Thr Tyr Val Asn Glu Thr Leu Asp Lys Gly
 85 90 95
 Ile Asp Val Phe Leu Glu Ile Glu Val Gln Gly Ala Leu Gln Val Lys
 100 105 110
 Lys Lys Val Pro Asp Ala Val Phe Ile Phe Leu Thr Pro Pro Asp Leu
 115 120 125
 Asp Glu Leu Gln Asp Arg Leu Val Gly Arg Gly Thr Asp Ser Ala Glu
 130 135 140
 Val Ile Ala Gln Arg Ile Glu Lys Ala Lys Glu Glu Ile Ala Leu Met
 145 150 155 160
 Arg Glu Tyr Asp Tyr Ala Ile Val Asn Asp Gln Val Pro Leu Ala Ala
 165 170 175
 Glu Arg Val Lys Cys Val Ile Glu Ala Glu His Phe Cys Val Asp Arg
 180 185 190
 Val Ile Gly His Tyr Gln Glu Met Leu Pro Lys Ser Pro Thr Thr Arg
 195 200 205

<210> 233

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 233

gcggcgccgc atatggcaga ccgaggctta c

31

<210> 234

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 234

gcgcggatcc tcgggtagtt ggagattttg

30

<210> 235

<211> 33

<212> PRT

<213> Streptococcus pneumoniae

<400> 235

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Tyr | Ala | Ile | Val | Asn | Asp | Gln | Val | Pro | Leu | Ala | Ala | Glu | Arg | Val |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Cys | Val | Ile | Glu | Ala | Glu | His | Phe | Cys | Val | Asp | Arg | Val | Ile | Gly |
| | | | 20 | | | | | 25 | | | | | 30 | | |

His

<210> 236

<211> 13

<212> PRT

<213> Streptococcus pneumoniae

<400> 236

| | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Gly | Leu | Leu | Ile | Val | Phe | Ser | Gly | Pro | Ser | Gly | Val |
| 1 | | | | 5 | | | | | 10 | | | |

<210> 237

<211> 31

<212> PRT

<213> Streptococcus pneumoniae

<400> 237

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Ile | Asp | Val | Phe | Leu | Glu | Ile | Glu | Val | Gln | Gly | Ala | Leu | Gln | Val |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Lys | Lys | Val | Pro | Asp | Ala | Val | Phe | Ile | Phe | Leu | Thr | Pro | Pro |
| | | | 20 | | | | | 25 | | | | | 30 | |

<210> 238

<211> 513

<212> DNA

<213> Streptococcus pneumoniae

<400> 238

| | | | | | | |
|------------|------------|------------|------------|------------|-------------|-----|
| atgaatttaa | aagattacat | tgcaacaatt | gaaaattatc | caaaggaagg | cattaccttc | 60 |
| cgtgatatta | gtcctttgat | ggctgatgga | aatgcttata | gctacgctgt | tcgtgaaatc | 120 |
| gttcagtatg | ctactgacaa | gaaagtcgac | atgatcgtgg | gacctgaagc | tcgtggattt | 180 |
| atcgtggggt | gtccagttgc | ctttgagttg | ggaattgggt | ttgcgcctgt | tcgtaagcca | 240 |
| ggtaaattgc | cacgcgaagt | tatttctgct | gactatgaaa | aagagtacgg | tgatcgatacc | 300 |


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ttgactatgc acgcggatgc cattaagcca ggtcaacgtg ttcttattgt agatgacctt 360
ttggcgacag gtggaactgt taaggcaact atcgagatga ttgaaaaact tggtggtggt 420
atggcagggt gtgccttcct tgttgaattg gatgaattga acggccgtga aaaaattggt 480
gactacgact acaaagttct tatgcattat taa 513

```

<210> 239

<211> 170

<212> PRT

<213> Streptococcus pneumoniae

<400> 239

```

Met Asn Leu Lys Asp Tyr Ile Ala Thr Ile Glu Asn Tyr Pro Lys Glu
  1             5             10             15

Gly Ile Thr Phe Arg Asp Ile Ser Pro Leu Met Ala Asp Gly Asn Ala
      20             25             30

Tyr Ser Tyr Ala Val Arg Glu Ile Val Gln Tyr Ala Thr Asp Lys Lys
      35             40             45

Val Asp Met Ile Val Gly Pro Glu Ala Arg Gly Phe Ile Val Gly Cys
      50             55             60

Pro Val Ala Phe Glu Leu Gly Ile Gly Phe Ala Pro Val Arg Lys Pro
      65             70             75             80

Gly Lys Leu Pro Arg Glu Val Ile Ser Ala Asp Tyr Glu Lys Glu Tyr
      85             90             95

Gly Val Asp Thr Leu Thr Met His Ala Asp Ala Ile Lys Pro Gly Gln
      100            105            110

Arg Val Leu Ile Val Asp Asp Leu Leu Ala Thr Gly Gly Thr Val Lys
      115            120            125

Ala Thr Ile Glu Met Ile Glu Lys Leu Gly Gly Val Met Ala Gly Cys
      130            135            140

Ala Phe Leu Val Glu Leu Asp Glu Leu Asn Gly Arg Glu Lys Ile Gly
      145            150            155            160

Asp Tyr Asp Tyr Lys Val Leu Met His Tyr
      165            170

```

<210> 240

<211> 513

<212> DNA

<213> Streptococcus pneumoniae

<400> 240

```

atgaatttaa aagattacat tgcaacaatt gaaaattatc caaaggaagg cattaccttc 60
cgtgatatta gtcctttgat ggctgatgga aatgcttata gctacgctgt tcgtgaaatc 120
gttcagtatg ctactgacaa gaaagtcgac atgatcgtgg gacctgaagc tcgtggattt 180
atcgtggggt gtccagttgc ctttgagttg ggaattgggt ttgcgcctgt tcgtaagcca 240
ggtaaatgac cacgcgaagt tatttctgct gactatgaaa aagagtacgg tgcgataact 300
ttgactatgc acgcggatgc cattaagcca ggtcaacgtg ttcttattgt agatgacctt 360

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ttggcgacag gtggaactgt taaggcaact atcgagatga ttgaaaaact tgggtggtgtt 420
 atggcaggtt gtgccttcct tgttgaattg gatgaattga acggccgtga aaaaattggt 480
 gactacgact acaaagttct tatgcattat taa 513

<210> 241

<211> 170

<212> PRT

<213> Streptococcus pneumoniae

<400> 241

Met Asn Leu Lys Asp Tyr Ile Ala Thr Ile Glu Asn Tyr Pro Lys Glu
 1 5 10 15
 Gly Ile Thr Phe Arg Asp Ile Ser Pro Leu Met Ala Asp Gly Asn Ala
 20 25 30
 Tyr Ser Tyr Ala Val Arg Glu Ile Val Gln Tyr Ala Thr Asp Lys Lys
 35 40 45
 Val Asp Met Ile Val Gly Pro Glu Ala Arg Gly Phe Ile Val Gly Cys
 50 55 60
 Pro Val Ala Phe Glu Leu Gly Ile Gly Phe Ala Pro Val Arg Lys Pro
 65 70 75 80
 Gly Lys Leu Pro Arg Glu Val Ile Ser Ala Asp Tyr Glu Lys Glu Tyr
 85 90 95
 Gly Val Asp Thr Leu Thr Met His Ala Asp Ala Ile Lys Pro Gly Gln
 100 105 110
 Arg Val Leu Ile Val Asp Asp Leu Leu Ala Thr Gly Gly Thr Val Lys
 115 120 125
 Ala Thr Ile Glu Met Ile Glu Lys Leu Gly Gly Val Met Ala Gly Cys
 130 135 140
 Ala Phe Leu Val Glu Leu Asp Glu Leu Asn Gly Arg Glu Lys Ile Gly
 145 150 155 160
 Asp Tyr Asp Tyr Lys Val Leu Met His Tyr
 165 170

<210> 242

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 242

gcggcgcccc atatgaattt aaaagattac attgcaac

<210> 243
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 243
 gcgcggatcc ataatgcata agaactttgt agtc 34

<210> 244
 <211> 22
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 244
 Gly Phe Ile Val Gly Cys Pro Val Ala Phe Glu Leu Gly Ile Gly Phe
 1 5 10 15
 Ala Pro Val Arg Lys Pro
 20

<210> 245
 <211> 13
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 245
 Gly Val Met Ala Gly Cys Ala Phe Leu Val Glu Leu Asp
 1 5 10

<210> 246
 <211> 14
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 246
 Gly Gln Arg Val Leu Ile Val Asp Asp Leu Leu Ala Thr Gly
 1 5 10

<210> 247
 <211> 744
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 247
 gtgaaaatgg cgaatcccaa gtataaacgt attttaatca agttatcagg tgaagccctt 60
 gccggtgaac gtggcgtagg gattgatatc caaacagttc aaacaatcgc aaaagagatt 120
 caagaagtgc atagcttagg tatcgaaatt gcccttggtta tcggtggagg aaatctctgg 180
 cgtggagaac ctgcagcaga agcaggtatg gaccgtgttc aggcagatta cacaggaatg 240
 cttgggactg ttatgaatgc tcttgtgatg gcagattcat tgcaacaagt tggggttgat 300
 acgcgtgtac aaacagctat tgccatgcaa caagtggcag agccttatgt ccgtggacgt 360

```

gcccttcgtc accttgaaaa aggccgtatc gttatctttg gtgctggaat tggttcacct 420
tactttctcga cagatacaac agcggccctt cgtgcagctg aaatcgaagc agatgccatc 480
ctcatggcta aaaatggtgt cgatgggtgt tacaatgccg atcctaagaa agataagaca 540
gctgttaagt ttgaagaatt gacccaccgt gacgttatca ataaaggctc tcgtatcatg 600
gactcaacag cttcaaccct ctcaatggac aacgacattg acttggttgt attcaacatg 660
aaccaaccag gcaacatcaa acgtgtcgta tttggtgaaa atatcggaac aacagtttca 720
aataatatcg aagaaaagga ataa                                     744

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<210> 248

<211> 247

<212> PRT

<213> Streptococcus pneumoniae

<400> 248

```

Val Lys Met Ala Asn Pro Lys Tyr Lys Arg Ile Leu Ile Lys Leu Ser
  1              5              10              15

Gly Glu Ala Leu Ala Gly Glu Arg Gly Val Gly Ile Asp Ile Gln Thr
          20              25              30

Val Gln Thr Ile Ala Lys Glu Ile Gln Glu Val His Ser Leu Gly Ile
      35              40              45

Glu Ile Ala Leu Val Ile Gly Gly Gly Asn Leu Trp Arg Gly Glu Pro
      50              55              60

Ala Ala Glu Ala Gly Met Asp Arg Val Gln Ala Asp Tyr Thr Gly Met
      65              70              75              80

Leu Gly Thr Val Met Asn Ala Leu Val Met Ala Asp Ser Leu Gln Gln
          85              90              95

Val Gly Val Asp Thr Arg Val Gln Thr Ala Ile Ala Met Gln Gln Val
      100              105              110

Ala Glu Pro Tyr Val Arg Gly Arg Ala Leu Arg His Leu Glu Lys Gly
      115              120              125

Arg Ile Val Ile Phe Gly Ala Gly Ile Gly Ser Pro Tyr Phe Ser Thr
      130              135              140

Asp Thr Thr Ala Ala Leu Arg Ala Ala Glu Ile Glu Ala Asp Ala Ile
      145              150              155              160

Leu Met Ala Lys Asn Gly Val Asp Gly Val Tyr Asn Ala Asp Pro Lys
          165              170              175

Lys Asp Lys Thr Ala Val Lys Phe Glu Glu Leu Thr His Arg Asp Val
      180              185              190

Ile Asn Lys Gly Leu Arg Ile Met Asp Ser Thr Ala Ser Thr Leu Ser
      195              200              205

Met Asp Asn Asp Ile Asp Leu Val Val Phe Asn Met Asn Gln Pro Gly
      210              215              220

```

Asn Ile Lys Arg Val Val Phe Gly Glu Asn Ile Gly Thr Thr Val Ser
 225 230 235 240

Asn Asn Ile Glu Glu Lys Glu
 245

<210> 249

<211> 744

<212> DNA

<213> Streptococcus pneumoniae

<400> 249

```

gtgaaaatgg cgaatcccaa gtataaacgt attttaatca agttatcagg tgaagccctt 60
gccggtgaac gtggcgtagg gattgatatc caaacagttc aaacaatcgc aaaagagatt 120
caagaagttc atagcttagg tatcgaaatt gcccttggtt ttggtggagg aaatctctgg 180
cgtggagacc ctgcagcaga agcaggtatg gaccgtgttc aggcagatta cactggaatg 240
cttgggactg ttatgaatgc tcttgatgat gcagattcat tgcaacaagt tggggttgat 300
acgcgtgtac aaacagctat tgctatgcaa caagtggcag agccttatgt ccgtggacgt 360
gcccttcgtc accttgaaaa aggcggtatc gttatctttg gtgctggaat tggttcacca 420
tactttctcg cagatacaac agcggccctt cgtgcagctg aaatcgaagc agatgccatc 480
ctcatggcta aaaatggcgt cgatgggtgtg tacaatgccg atcctaagaa ggacaagaca 540
gccgttaagt ttgaagaatt gacccaccgt gatgttatca acaaaggtct tcgtatcatg 600
gactcaacag cctcaaccct ctcaatggac aacgacattg acttggttgt cttcaacatg 660
aaccaatcag gcaacatcaa acgtgtcgta tttggtgaaa atatcggaac aacagtttca 720
aataatatcg aagaaaagga ataa                                     744

```

<210> 250

<211> 247

<212> PRT

<213> Streptococcus pneumoniae

<400> 250

```

Val Lys Met Ala Asn Pro Lys Tyr Lys Arg Ile Leu Ile Lys Leu Ser
  1           5           10           15

Gly Glu Ala Leu Ala Gly Glu Arg Gly Val Gly Ile Asp Ile Gln Thr
          20           25           30

Val Gln Thr Ile Ala Lys Glu Ile Gln Glu Val His Ser Leu Gly Ile
      35           40           45

Glu Ile Ala Leu Val Ile Gly Gly Gly Asn Leu Trp Arg Gly Asp Pro
      50           55           60

Ala Ala Glu Ala Gly Met Asp Arg Val Gln Ala Asp Tyr Thr Gly Met
      65           70           75           80

Leu Gly Thr Val Met Asn Ala Leu Val Met Ala Asp Ser Leu Gln Gln
          85           90           95

Val Gly Val Asp Thr Arg Val Gln Thr Ala Ile Ala Met Gln Gln Val
      100           105           110

Ala Glu Pro Tyr Val Arg Gly Arg Ala Leu Arg His Leu Glu Lys Gly
      115           120           125

```

Arg Ile Val Ile Phe Gly Ala Gly Ile Gly Ser Pro Tyr Phe Ser Thr
 130 135 140
 Asp Thr Thr Ala Ala Leu Arg Ala Ala Glu Ile Glu Ala Asp Ala Ile
 145 150 155 160
 Leu Met Ala Lys Asn Gly Val Asp Gly Val Tyr Asn Ala Asp Pro Lys
 165 170 175
 Lys Asp Lys Thr Ala Val Lys Phe Glu Glu Leu Thr His Arg Asp Val
 180 185 190
 Ile Asn Lys Gly Leu Arg Ile Met Asp Ser Thr Ala Ser Thr Leu Ser
 195 200 205
 Met Asp Asn Asp Ile Asp Leu Val Val Phe Asn Met Asn Gln Ser Gly
 210 215 220
 Asn Ile Lys Arg Val Val Phe Gly Glu Asn Ile Gly Thr Thr Val Ser
 225 230 235 240
 Asn Asn Ile Glu Glu Lys Glu
 245

<210> 251

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 251

gcggcgccc atatgaaaat ggcgaatccc aag

33

<210> 252

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 252

gcgcgatcc ttccttttct tcgatattat ttg

33

<210> 253

<211> 33

<212> DNA

<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 253
 gcggcgcccc atatgaaaat ggcgaatccc aag 33

 <210> 254
 <211> 34
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 254
 gcggcgcccc atatggcgaa tcccaagtat aaac 34

 <210> 255
 <211> 42
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 255
 gcggcgcccc atatgaatcc caagtataaa cgtatttttaa tc 42

 <210> 256
 <211> 36
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 256
 gcggcgcccc atatgaagta taaacgtatt ttaatc 36

 <210> 257
 <211> 38
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 257
 gcggcgcccc atatgaaacg tattttaatc aagttatc 38

<210> 258
 <211> 35
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 258
 gcggcgcccc atatgatttt aatcaagtta tcagg 35

 <210> 259
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 259
 gcggcgcccc atatgaagtt atcaggtgaa gcc 33

 <210> 260
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 260
 gcgcggatcc ttccttttct tcgatattat ttg 33

 <210> 261
 <211> 34
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 261
 gcgcggatcc tggtccgata ttttcaccaa atac 34

 <210> 262
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 262

gcgcggatcc aactgttggt ccgatatttt cac

33

<210> 263

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 263

gcgcggatcc atttgaaact gttgttccga tatttttc

37

<210> 264

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 264

gcgcggatcc gatattattt gaaactgttg ttc

33

<210> 265

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 265

gcgcggatcc attttcacca aatacgacac g

31

<210> 266

<211> 30

<212> PRT

<213> Streptococcus pneumoniae

<400> 266

Gly Ile Asp Ile Gln Thr Val Gln Thr Ile Ala Lys Glu Ile Gln Glu
1 5 10 15

Val His Ser Leu Gly Ile Glu Ile Ala Leu Val Ile Gly Gly
 20 25 30

<210> 267
 <211> 7
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 267
 Ile Asp Leu Val Val Phe Asn
 1 5

<210> 268
 <211> 37
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 268
 Val Met Asn Ala Leu Val Met Ala Asp Ser Leu Gln Gln Val Gly Val
 1 5 10 15

Asp Thr Arg Val Gln Thr Ala Ile Ala Met Gln Gln Val Ala Glu Pro
 20 25 30

Tyr Val Arg Gly Arg
 35

<210> 269
 <211> 738
 <212> DNA
 <213> Pseudomonas aeruginosa

<400> 269
 atggctcagc aactgagcgc tcgtcaacct cgctataaac gcattcttct aaagttgagc 60
 ggcgaagccc tgatgggctc ggaggagttc ggcatatgat ccaagggtgct ggaccgcatg 120
 gcgctggaaa tcggccagtt ggtcgggata ggctgacagg tcggcctggg catcggcggc 180
 ggcaacctgt tccgcggcgc ggccctgtcc gcggccggca tggaccgggt gaccggcgac 240
 cacatgggga tgctggccac cgtgatgaac ggccctggcga tgcgcgatgc gctggagcgc 300
 tcgaacatcc ccgcgctggg gatgtcggcg atctccatgg tcggtgtgac cgaccactac 360
 gaccgcccga aggccatgcg ccacctcggc ggtggcgagg tggatgatct ctccgccggt 420
 accggcaacc cgttcttcac caccgactcg gcggcttgcc tgcgcgccat cgagatcgac 480
 gccgacgtgg tccttaaggc taccaaggct gatggcgtgt aactgcca cccgttcaag 540
 gacccgaatg ccgagaagtt cgagcgcctg acctatgatg aagtgtcoga ccgcaagctc 600
 ggctgtgatg acctgaccgc catctgcctg tgccgtgacc agaacatgcc gctgcccgtg 660
 ttcaacatga acaagccggg cgcattgctg aatattgttg ttggtggtgc cgaaggcacc 720
 ctgatcgagg agggttga 738

<210> 270
 <211> 245
 <212> PRT
 <213> Pseudomonas aeruginosa

<400> 270

```

Met Ala Gln Gln Leu Ser Ala Arg Gln Pro Arg Tyr Lys Arg Ile Leu
 1           5           10           15

Leu Lys Leu Ser Gly Glu Ala Leu Met Gly Ser Glu Glu Phe Gly Ile
      20           25           30

Asp Pro Lys Val Leu Asp Arg Met Ala Leu Glu Ile Gly Gln Leu Val
      35           40           45

Gly Ile Gly Val Gln Val Gly Leu Val Ile Gly Gly Gly Asn Leu Phe
 50           55           60

Arg Gly Ala Ala Leu Ser Ala Ala Gly Met Asp Arg Val Thr Gly Asp
 65           70           75           80

His Met Gly Met Leu Ala Thr Val Met Asn Gly Leu Ala Met Arg Asp
      85           90           95

Ala Leu Glu Arg Ser Asn Ile Pro Ala Leu Val Met Ser Ala Ile Ser
      100           105           110

Met Val Gly Val Thr Asp His Tyr Asp Arg Arg Lys Ala Met Arg His
      115           120           125

Leu Gly Gly Gly Glu Val Val Ile Phe Ser Ala Gly Thr Gly Asn Pro
      130           135           140

Phe Phe Thr Thr Asp Ser Ala Ala Cys Leu Arg Ala Ile Glu Ile Asp
      145           150           155           160

Ala Asp Val Val Leu Lys Ala Thr Lys Val Asp Gly Val Tyr Thr Ala
      165           170           175

Asp Pro Phe Lys Asp Pro Asn Ala Glu Lys Phe Glu Arg Leu Thr Tyr
      180           185           190

Asp Glu Val Leu Asp Arg Lys Leu Gly Val Met Asp Leu Thr Ala Ile
      195           200           205

Cys Leu Cys Arg Asp Gln Asn Met Pro Leu Arg Val Phe Asn Met Asn
      210           215           220

Lys Pro Gly Ala Leu Leu Asn Ile Val Val Gly Gly Ala Glu Gly Thr
      225           230           235           240

Leu Ile Glu Glu Gly
      245

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<210> 271

<211> 738

<212> DNA

<213> *Pseudomonas aeruginosa*

<400> 271

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ggcgaagccc tgatgggctc ggaggagttc ggcacgatc ccaaggtgct ggaccgcatg 120

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gcgctggaaa tcggccagtt ggtcgggata ggcgtgcagg tcggcctggt catcggcggc 180
ggcaacctgt tccgcggcgc ggcctgtcc ggcggccggca tggaccgggt gaccggcgac 240
cacatgggga tgctggccac cgtgatgaac ggcctggcga tgcgcgatgc gctggagcgc 300
tcgaacatcc ccgcgctggt gatgtcggcg atctccatgg tcggtgtgac cgaccactac 360
gaccgcccga aggccatgcg ccacctcggc ggtggcgagg tggatgatt ctccgccggg 420
accggcaacc cgttcttcac caccgactcg gcggcttgcc tgcgcgccat cgagatcgac 480
gccgacgtgg tccttaaggc taccaaggtc gatggcgtgt aactgccga cccgttcaag 540
gacccgaatg ccgagaagtt cgagcgctg acctatgat aagtgtcga ccgcaagctc 600
ggcgtgatgg acctgaccgc catctgcctg tgccgtgacc agaacatgcc gctgcgggtg 660
ttcaacatga acaagccggg cgcattgctg aatattgttg ttggtggtgc cgaaggcacc 720
ctgatcgagg agggttga                                     738

```

<210> 272

<211> 245

<212> PRT

<213> *Pseudomonas aeruginosa*

<400> 272

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Met Ala Gln Gln Leu Ser Ala Arg Gln Pro Arg Tyr Lys Arg Ile Leu
 1              5              10              15

Leu Lys Leu Ser Gly Glu Ala Leu Met Gly Ser Glu Glu Phe Gly Ile
      20              25              30

Asp Pro Lys Val Leu Asp Arg Met Ala Leu Glu Ile Gly Gln Leu Val
      35              40              45

Gly Ile Gly Val Gln Val Gly Leu Val Ile Gly Gly Gly Asn Leu Phe
 50              55              60

Arg Gly Ala Ala Leu Ser Ala Ala Gly Met Asp Arg Val Thr Gly Asp
 65              70              75              80

His Met Gly Met Leu Ala Thr Val Met Asn Gly Leu Ala Met Arg Asp
      85              90              95

Ala Leu Glu Arg Ser Asn Ile Pro Ala Leu Val Met Ser Ala Ile Ser
      100              105              110

Met Val Gly Val Thr Asp His Tyr Asp Arg Arg Lys Ala Met Arg His
      115              120              125

Leu Gly Gly Gly Glu Val Val Ile Phe Ser Ala Gly Thr Gly Asn Pro
      130              135              140

Phe Phe Thr Thr Asp Ser Ala Ala Cys Leu Arg Ala Ile Glu Ile Asp
      145              150              155              160

Ala Asp Val Val Leu Lys Ala Thr Lys Val Asp Gly Val Tyr Thr Ala
      165              170              175

Asp Pro Phe Lys Asp Pro Asn Ala Glu Lys Phe Glu Arg Leu Thr Tyr
      180              185              190

Asp Glu Val Leu Asp Arg Lys Leu Gly Val Met Asp Leu Thr Ala Ile
      195              200              205

```

Cys Leu Cys Arg Asp Gln Asn Met Pro Leu Arg Val Phe Asn Met Asn
 210 215 220

Lys Pro Gly Ala Leu Leu Asn Ile Val Val Gly Gly Ala Glu Gly Thr
 225 230 235 240

Leu Ile Glu Glu Gly
 245

<210> 273

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 273

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31

<210> 274

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 274

gcgcggatcc accctcctcg atcaggggtg

29

<210> 275

<211> 22

<212> PRT

<213> Pseudomonas aeruginosa

<400> 275

Tyr Asp Glu Val Leu Asp Arg Lys Leu Gly Val Met Asp Leu Thr Ala
 1 5 10 15

Ile Cys Leu Cys Arg Asp
 20

<210> 276

<211> 18

<212> PRT

<213> Pseudomonas aeruginosa

<400> 276

Glu Ile Gly Gln Leu Val Gly Ile Gly Val Gln Val Gly Leu Val Ile
 1 5 10 15

<400> 277
Gly Ala Leu Leu Asn Ile Val Val Gly Gly
1 5 10

| <400> 278 | | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|------|--|
| atggctaaaa | aaattgtttc | tgatttagat | cttaaaggta | aaacagtcct | agtacgtgct | 60 | |
| gattttaacg | tacctttaaa | agacggtgaa | attactaatg | acaaccgtat | cgttcaagct | 120 | |
| ttacctacaa | ttcaatacat | catcgaacaa | ggtggtaaaa | tcgtactatt | ttcacattta | 180 | |
| ggtaaaagtga | aagaagaaag | tgataaaagca | aaattaactt | tacgtccagt | tgctgaagac | 240 | |
| ttatctaaga | aaatagataa | agaagtgtgt | ttcgtagccg | aaacacgcgg | cgaaaaactt | 300 | |
| gaagctgcta | ttaaagacct | taaagaaggc | gctgtattat | tagttgaaaa | tacacgttat | 360 | |
| gaagatttag | acggtaaaaa | agaatctaaa | aatgatccag | aattaggtaa | atactgggca | 420 | |
| tctttagggtg | atgtgtttgt | aaatgatgct | tttggtagctg | cgcacgtgta | gcattgcattc | 480 | |
| aatgttggtg | tttctacaca | tttagaaact | gcagctggat | tcttaatgga | taaagaaatt | 540 | |
| aagttttattg | gcggcgtagt | taacgatcca | cataaaccag | ttgttgctat | tttaggtgga | 600 | |
| gcaaaagtat | ctgacaaaat | taatgtcatc | aaaaacttag | ttaacatagc | tgataaaaatt | 660 | |
| atcatcggcg | gaggtatggc | ttatactttc | ttaaaggcgc | aaggtaaaga | aattggattt | 720 | |
| tcattatttag | aagaagataa | atacgacttc | gcaaagagatt | tattagaaaa | acattggtgat | 780 | |
| aaaattgtat | taccagtaga | cactaaagtt | gctaaagaat | tttctaataga | tgccaaaatc | 840 | |
| actgtagtac | catctgattc | aattccagca | gaccaagaag | gtatggatat | tggaaccaaac | 900 | |
| actgtaaaat | tatttgacga | tgaattagaa | ggtgcgcaca | ctgttgtagt | gaatggacct | 960 | |
| atgggtgtat | tcgagttcag | taactttgca | caagggtacaa | ttggtgtatg | taaagcaatt | 1020 | |
| gcaaaacctta | aaagatgcaat | tacgattatc | ggtggcgggtg | attcagctgc | agcagcaatc | 1080 | |
| tctttagggtt | ttgaaataat | gttactcat | atttcaactg | gtggcggcgtc | gctcattagag | 1140 | |
| tacctagaag | gtaaagaatt | gcttggtatc | aaagcaatca | ataataaata | a | 1191 | |

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<400> 279
Met Ala Lys Lys Ile Val Ser Asp Leu Asp Leu Lys Gly Lys Thr Val
  1             5             10             15
```

Asn Asp Asn Arg Ile Val Gln Ala Leu Pro Thr Ile Gln Tyr Ile Ile
35 40 45

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Gln | Gly | Gly | Lys | Ile | Val | Leu | Phe | Ser | His | Leu | Gly | Lys | Val | Lys |
| 50 | | | | | | 55 | | | | | 60 | | | | |
| Glu | Glu | Ser | Asp | Lys | Ala | Lys | Leu | Thr | Leu | Arg | Pro | Val | Ala | Glu | Asp |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Leu | Ser | Lys | Lys | Leu | Asp | Lys | Glu | Val | Val | Phe | Val | Pro | Glu | Thr | Arg |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Gly | Glu | Lys | Leu | Glu | Ala | Ala | Ile | Lys | Asp | Leu | Lys | Glu | Gly | Asp | Val |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Leu | Leu | Val | Glu | Asn | Thr | Arg | Tyr | Glu | Asp | Leu | Asp | Gly | Lys | Lys | Glu |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Ser | Lys | Asn | Asp | Pro | Glu | Leu | Gly | Lys | Tyr | Trp | Ala | Ser | Leu | Gly | Asp |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Val | Phe | Val | Asn | Asp | Ala | Phe | Gly | Thr | Ala | His | Arg | Glu | His | Ala | Ser |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Asn | Val | Gly | Ile | Ser | Thr | His | Leu | Glu | Thr | Ala | Ala | Gly | Phe | Leu | Met |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Asp | Lys | Glu | Ile | Lys | Phe | Ile | Gly | Gly | Val | Val | Asn | Asp | Pro | His | Lys |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Pro | Val | Val | Ala | Ile | Leu | Gly | Gly | Ala | Lys | Val | Ser | Asp | Lys | Ile | Asn |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Val | Ile | Lys | Asn | Leu | Val | Asn | Ile | Ala | Asp | Lys | Ile | Ile | Ile | Gly | Gly |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Gly | Met | Ala | Tyr | Thr | Phe | Leu | Lys | Ala | Gln | Gly | Lys | Glu | Ile | Gly | Ile |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Ser | Leu | Leu | Glu | Glu | Asp | Lys | Ile | Asp | Phe | Ala | Lys | Asp | Leu | Leu | Glu |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Lys | His | Gly | Asp | Lys | Ile | Val | Leu | Pro | Val | Asp | Thr | Lys | Val | Ala | Lys |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Glu | Phe | Ser | Asn | Asp | Ala | Lys | Ile | Thr | Val | Val | Pro | Ser | Asp | Ser | Ile |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Pro | Ala | Asp | Gln | Glu | Gly | Met | Asp | Ile | Gly | Pro | Asn | Thr | Val | Lys | Leu |
| | | 290 | | | | 295 | | | | | 300 | | | | |
| Phe | Ala | Asp | Glu | Leu | Glu | Gly | Ala | His | Thr | Val | Val | Trp | Asn | Gly | Pro |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Met | Gly | Val | Phe | Glu | Phe | Ser | Asn | Phe | Ala | Gln | Gly | Thr | Ile | Gly | Val |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Cys | Lys | Ala | Ile | Ala | Asn | Leu | Lys | Asp | Ala | Ile | Thr | Ile | Ile | Gly | Gly |
| | | | 340 | | | | | 345 | | | | | 350 | | |

Gly Asp Ser Ala Ala Ala Ala Ile Ser Leu Gly Phe Glu Asn Asp Phe
 355 360 365

Thr His Ile Ser Thr Gly Gly Gly Ala Ser Leu Glu Tyr Leu Glu Gly
 370 375 380

Lys Glu Leu Pro Gly Ile Lys Ala Ile Asn Asn Lys
 385 390 395

<210> 280

<211> 1191

<212> DNA

<213> Staphylococcus aureus

<400> 280

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ttacctacaa ttcaatacat catcgaacaa ggtggtaaaa tcgtactatt ttcacattta 180
ggtaaaagtga aagaagaaaag tgataaaagca aaattaactt tacgtccagt tgctgaagac 240
ttatctaaga aattagataa agaagttggt ttcgtaccag aaacacgcgg cgaaaaactt 300
gaagctgtcta ttaaagacct taaagaaggc gacgtattat tagttgaaaa tacacgttat 360
gaagatttag acggtaaaaa agaattctaaa aatgatccag aattaggtaa atactgggca 420
tctttagggtg atgtgtttgt aaatgatgct tttggtactg cgcacgtga gcatgcatct 480
aatgttggtta tttctacaca tttagaaact gcagctggat tcttaatgga taaagaaatt 540
aagtttattg gcggcgtagt taacgatcca cataaaccag ttggtgctat tttagggtgga 600
gcaaaagtat ctgacaaaat taatgtcatc aaaaacttag ttaacatagc tgataaaaatt 660
atcatcggcg gaggtatggc ttatactttc ttaaaagcgc aaggtaaaga aattgggtatt 720
tcattattag aagaagataa aatcgacttc gcaaaagatt tattagaaaa acatgggtgat 780
aaaattgtat taccagtaga cactaaagtt gctaaagaat tttctaata tgccaaaatc 840
actgtagtac catctgattc aattccagca gacccaaaag gtatggatat tggacccaaac 900
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gcaaacctta aagatgcaat tacgattatc ggtggcgggtg attcagctgc agcagcaatc 1080
tctttagggtt ttgaaaatga cttcactcat atttcaactg gtggcggcgc gtcattagag 1140
tacctagaag gtaaaagaatt gcctgggtatc aaagcaatca ataataaata a 1191

```

<210> 281

<211> 396

<212> PRT

<213> Staphylococcus aureus

<400> 281

Met Ala Lys Lys Ile Val Ser Asp Leu Asp Leu Lys Gly Lys Thr Val
 1 5 10 15

Leu Val Arg Ala Asp Phe Asn Val Pro Leu Lys Asp Gly Glu Ile Thr
 20 25 30

Asn Asp Asn Arg Ile Val Gln Ala Leu Pro Thr Ile Gln Tyr Ile Ile
 35 40 45

Glu Gln Gly Gly Lys Ile Val Leu Phe Ser His Leu Gly Lys Val Lys
 50 55 60

Glu Glu Ser Asp Lys Ala Lys Leu Thr Leu Arg Pro Val Ala Glu Asp
 65 70 75 80

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Ser | Lys | Lys | Leu | Asp | Lys | Glu | Val | Val | Phe | Val | Pro | Glu | Thr | Arg | 85 | 90 | 95 |
| Gly | Glu | Lys | Leu | Glu | Ala | Ala | Ile | Lys | Asp | Leu | Lys | Glu | Gly | Asp | Val | 100 | 105 | 110 |
| Leu | Leu | Val | Glu | Asn | Thr | Arg | Tyr | Glu | Asp | Leu | Asp | Gly | Lys | Lys | Glu | 115 | 120 | 125 |
| Ser | Lys | Asn | Asp | Pro | Glu | Leu | Gly | Lys | Tyr | Trp | Ala | Ser | Leu | Gly | Asp | 130 | 135 | 140 |
| Val | Phe | Val | Asn | Asp | Ala | Phe | Gly | Thr | Ala | His | Arg | Glu | His | Ala | Ser | 145 | 150 | 155 |
| Asn | Val | Gly | Ile | Ser | Thr | His | Leu | Glu | Thr | Ala | Ala | Gly | Phe | Leu | Met | 165 | 170 | 175 |
| Asp | Lys | Glu | Ile | Lys | Phe | Ile | Gly | Gly | Val | Val | Asn | Asp | Pro | His | Lys | 180 | 185 | 190 |
| Pro | Val | Val | Ala | Ile | Leu | Gly | Gly | Ala | Lys | Val | Ser | Asp | Lys | Ile | Asn | 195 | 200 | 205 |
| Val | Ile | Lys | Asn | Leu | Val | Asn | Ile | Ala | Asp | Lys | Ile | Ile | Ile | Gly | Gly | 210 | 215 | 220 |
| Gly | Met | Ala | Tyr | Thr | Phe | Leu | Lys | Ala | Gln | Gly | Lys | Glu | Ile | Gly | Ile | 225 | 230 | 235 |
| Ser | Leu | Leu | Glu | Glu | Asp | Lys | Ile | Asp | Phe | Ala | Lys | Asp | Leu | Leu | Glu | 245 | 250 | 255 |
| Lys | His | Gly | Asp | Lys | Ile | Val | Leu | Pro | Val | Asp | Thr | Lys | Val | Ala | Lys | 260 | 265 | 270 |
| Glu | Phe | Ser | Asn | Asp | Ala | Lys | Ile | Thr | Val | Val | Pro | Ser | Asp | Ser | Ile | 275 | 280 | 285 |
| Pro | Ala | Asp | Gln | Lys | Gly | Met | Asp | Ile | Gly | Pro | Asn | Thr | Val | Lys | Leu | 290 | 295 | 300 |
| Phe | Ala | Asp | Glu | Leu | Glu | Gly | Ala | His | Thr | Val | Val | Trp | Asn | Gly | Pro | 305 | 310 | 315 |
| Met | Gly | Val | Phe | Glu | Phe | Ser | Asn | Phe | Ala | Gln | Gly | Thr | Ile | Gly | Val | 325 | 330 | 335 |
| Cys | Lys | Ala | Ile | Ala | Asn | Leu | Lys | Asp | Ala | Ile | Thr | Ile | Ile | Gly | Gly | 340 | 345 | 350 |
| Gly | Asp | Ser | Ala | Ala | Ala | Ala | Ile | Ser | Leu | Gly | Phe | Glu | Asn | Asp | Phe | 355 | 360 | 365 |
| Thr | His | Ile | Ser | Thr | Gly | Gly | Gly | Ala | Ser | Leu | Glu | Tyr | Leu | Glu | Gly | 370 | 375 | 380 |

Lys Glu Leu Pro Gly Ile Lys Ala Ile Asn Asn Lys
 385 390 395

<210> 282

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 282

gcggcgcccc atatggctaa aaaaattggt tctgatttag

40

<210> 283

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 283

gcgcggatcc tttcttagat aagtcttcag caac

34

<210> 284

<211> 12

<212> PRT

<213> Staphylococcus aureus

<400> 284

Gly Lys Ile Val Leu Phe Ser His Leu Gly Lys Val
 1 5 10

<210> 285

<211> 40

<212> PRT

<213> Staphylococcus aureus

<400> 285

Ile Gly Gly Val Val Asn Asp Pro His Lys Pro Val Val Ala Ile Leu
 1 5 10 15

Gly Gly Ala Lys Val Ser Asp Lys Ile Asn Val Ile Lys Asn Leu Val
 20 25 30

Asn Ile Ala Asp Lys Ile Ile Ile
 35 40

<210> 286
 <211> 9
 <212> PRT
 <213> *Staphylococcus aureus*

<400> 286
 Asp Lys Glu Val Val Phe Val Pro Glu
 1 5

<210> 287
 <211> 1293
 <212> DNA
 <213> *Escherichia coli*

<400> 287
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 ggaaaaatca tcatgagcct ggccggtaaa aaaatcggtc tcggcgtag cggcggtatt 120
 gctgcctata aaaccctga actgggtgcg cgtttgcgag atcgcggggc cgacgtccgc 180
 gtagccatga ccgaagcggc aaaagccttt atcacccac ttagcttgca ggcgggtttct 240
 ggttatcccg tttccgacag tctgctggac ccggcagccg aagccgctat gggccatatt 300
 gagctgggta aatgggctga tttagtgtt ctcgcccctg ccacggcaga tttgattgcc 360
 cgtgttgctg ccggaatggc gaatgacctg gtatcgacga tttgtctggc tacacctgcg 420
 cctgtagccg tgctccccgc catgaaccag cagatgtacc gtgccgctgc caccgagcat 480
 aatttagagg tgcttgcttc ccgtgggttg ctcattctgg ggccagacag tggcagtcag 540
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 ccgacgcgtg aaccgctcga tccggtgcgt tatatctcta atcacagctc cggcaagatg 720
 ggttttgcta tcgccgccgc cgctgcccgt cgtggcgcgga acgtcacgct ggtatcaggt 780
 ccggtttcac taccgacgcc accgtttgtt aaacgtgttg atgtgatgac cgcgctggaa 840
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 cagccaactc aaggatttaa cagcgacaac aacgcattac accttttctg gcaggacgga 1200
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 gtgaccgcgt atgatgaaaa aaatcgacgt taa 1293

<210> 288
 <211> 430
 <212> PRT
 <213> *Escherichia coli*

<400> 288
 Met Lys Ala Arg Gln Gln Lys Tyr Cys Asp Lys Ile Ala Asn Phe Trp
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 Cys His Pro Thr Gly Lys Ile Ile Met Ser Leu Ala Gly Lys Lys Ile
 20 25 30
 Val Leu Gly Val Ser Gly Gly Ile Ala Ala Tyr Lys Thr Pro Glu Leu
 35 40 45
 Val Arg Arg Leu Arg Asp Arg Gly Ala Asp Val Arg Val Ala Met Thr
 50 55 60

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Glu | Ala | Ala | Lys | Ala | Phe | Ile | Thr | Pro | Leu | Ser | Leu | Gln | Ala | Val | Ser | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Gly | Tyr | Pro | Val | Ser | Asp | Ser | Leu | Leu | Asp | Pro | Ala | Ala | Glu | Ala | Ala | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| Met | Gly | His | Ile | Glu | Leu | Gly | Lys | Trp | Ala | Asp | Leu | Val | Ile | Leu | Ala | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Pro | Ala | Thr | Ala | Asp | Leu | Ile | Ala | Arg | Val | Ala | Ala | Gly | Met | Ala | Asn | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Asp | Leu | Val | Ser | Thr | Ile | Cys | Leu | Ala | Thr | Pro | Ala | Pro | Val | Ala | Val | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |
| Leu | Pro | Ala | Met | Asn | Gln | Gln | Met | Tyr | Arg | Ala | Ala | Ala | Thr | Gln | His | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| Asn | Leu | Glu | Val | Leu | Ala | Ser | Arg | Gly | Leu | Leu | Ile | Trp | Gly | Pro | Asp | |
| | | | | 165 | | | | | 170 | | | | | 175 | | |
| Ser | Gly | Ser | Gln | Ala | Cys | Gly | Asp | Ile | Gly | Pro | Gly | Arg | Met | Leu | Asp | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Pro | Leu | Thr | Ile | Val | Asp | Met | Ala | Val | Ala | His | Phe | Ser | Pro | Val | Asn | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Asp | Leu | Lys | His | Leu | Asn | Ile | Met | Ile | Thr | Ala | Gly | Pro | Thr | Arg | Glu | |
| | 210 | | | | | 215 | | | | | 220 | | | | | |
| Pro | Leu | Asp | Pro | Val | Arg | Tyr | Ile | Ser | Asn | His | Ser | Ser | Gly | Lys | Met | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| Gly | Phe | Ala | Ile | Ala | Ala | Ala | Ala | Ala | Arg | Arg | Gly | Ala | Asn | Val | Thr | |
| | | | | 245 | | | | | 250 | | | | | 255 | | |
| Leu | Val | Ser | Gly | Pro | Val | Ser | Leu | Pro | Thr | Pro | Pro | Phe | Val | Lys | Arg | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| Val | Asp | Val | Met | Thr | Ala | Leu | Glu | Met | Glu | Ala | Ala | Val | Asn | Ala | Ser | |
| | | 275 | | | | | 280 | | | | | 285 | | | | |
| Val | Gln | Gln | Gln | Asn | Ile | Phe | Ile | Gly | Cys | Ala | Ala | Val | Ala | Asp | Tyr | |
| | 290 | | | | | 295 | | | | | 300 | | | | | |
| Arg | Ala | Ala | Thr | Val | Ala | Pro | Glu | Lys | Ile | Lys | Lys | Gln | Ala | Thr | Gln | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | |
| Gly | Asp | Glu | Leu | Thr | Ile | Lys | Met | Val | Lys | Asn | Pro | Asp | Ile | Val | Ala | |
| | | | | 325 | | | | | 330 | | | | | 335 | | |
| Gly | Val | Ala | Ala | Leu | Lys | Asp | His | Arg | Pro | Tyr | Val | Val | Gly | Phe | Ala | |
| | | | 340 | | | | | 345 | | | | | 350 | | | |
| Ala | Glu | Thr | Asn | Asn | Val | Glu | Glu | Tyr | Ala | Arg | Gln | Lys | Arg | Ile | Arg | |
| | | 355 | | | | | 360 | | | | | 365 | | | | |

Lys Asn Leu Asp Leu Ile Cys Ala Asn Asp Val Ser Gln Pro Thr Gln
370 375 380

Gly Phe Asn Ser Asp Asn Asn Ala Leu His Leu Phe Trp Gln Asp Gly
385 390 395 400

Asp Lys Val Leu Pro Leu Glu Arg Lys Glu Leu Leu Gly Gln Leu Leu
405 410 415

Leu Asp Glu Ile Val Thr Arg Tyr Asp Glu Lys Asn Arg Arg
420 425 430

<210> 289

<211> 1293

<212> DNA

<213> Escherichia coli

<400> 289

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ggaaaaaatca tcatgagcct ggccggtaaa aaaatcggtc tcggcgtag cggcggtatt 120
gctgcctata aaacccctga actggtgcgt cgtttgcgcg atcgcggggc cgacgtccgc 180
gtagccatga ccgaagcggc aaaagccttt atcaccaccac ttagcttgca ggcggtttct 240
ggttatcccg tttccgacag tctgctggac ccggcagccg aagccgctat gggccatatt 300
gagctgggta aatgggctga tttagtgtt ctcgcccctg ccacggcaga tttgattgcc 360
cgtgttgctg ccggaatggc gaatgacctg gtatcgacga tttgtctggc tacacctgcg 420
cctgtagccg tgctccccgc catgaaccag cagatgtacc gtgccgctgc cacgcagcat 480
aathtagagg tgcttgcttc ccgtggtttg ctcctctggg ggccagacag tggcagtcag 540
gcttgtggtg atatcggtcc tgggcgaatg ctcgatccgt taaccattgt ggatatggcg 600
gtagcgcat tttcgcccgt caacgacctg aaacatctga acattatgat taccgcccgc 660
ccgacgcgtg aaccgctcga tccggtgcgt tatatctcta atcacagctc cggcaagatg 720
ggttttgcta tcgcgcgcgc cgctgcccgt cgtggcgcca acgtcacgct ggtatcaggt 780
ccggtttcac taccgacgcc accgtttgtt aaacgtgttg atgtgatgac cgcgctggaa 840
atggaagccg ccgtgaatgc ttctgtacag cagcaaaaata tttttatcgg ctgcgcccgc 900
gtggcggatt atcgcgcagc taccgtggcc ccagagaaaa tcaaaaagca ggccacgcag 960
ggtgatgaat taacaataaa aatggttaaa aaccccgata tcgtcgagg cgttgccgca 1020
ctaaaagacc atcgacccta cgctcggtggg tttgcccgcg aaacaaataa tgtggaagaa 1080
tacgcccggc aaaaacgtat ccgtaaaaaac cttgatctga tctgcgcgaa cgatgtttcc 1140
cagccaactc aaggatttaa cagcgacaac aacgcattac accttttctg gcaggacgga 1200
gataaagtct taccgcttga gcgcaaagag ctccttggcc aattattact cgacgagatc 1260
gtgaccctgt atgatgaaaa aaatcgacgt taa 1293
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<210> 290

<211> 430

<212> PRT

<213> Escherichia coli

<400> 290

Met Lys Ala Arg Gln Gln Lys Tyr Cys Asp Lys Ile Ala Asn Phe Trp
1 5 10 15

Cys His Pro Thr Gly Lys Ile Ile Met Ser Leu Ala Gly Lys Lys Ile
20 25 30

Val Leu Gly Val Ser Gly Gly Ile Ala Ala Tyr Lys Thr Pro Glu Leu
35 40 45

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Arg | Arg | Leu | Arg | Asp | Arg | Gly | Ala | Asp | Val | Arg | Val | Ala | Met | Thr | 50 | 55 | 60 | |
| Glu | Ala | Ala | Lys | Ala | Phe | Ile | Thr | Pro | Leu | Ser | Leu | Gln | Ala | Val | Ser | 65 | 70 | 75 | 80 |
| Gly | Tyr | Pro | Val | Ser | Asp | Ser | Leu | Leu | Asp | Pro | Ala | Ala | Glu | Ala | Ala | 85 | 90 | 95 | |
| Met | Gly | His | Ile | Glu | Leu | Gly | Lys | Trp | Ala | Asp | Leu | Val | Ile | Leu | Ala | 100 | 105 | 110 | |
| Pro | Ala | Thr | Ala | Asp | Leu | Ile | Ala | Arg | Val | Ala | Ala | Gly | Met | Ala | Asn | 115 | 120 | 125 | |
| Asp | Leu | Val | Ser | Thr | Ile | Cys | Leu | Ala | Thr | Pro | Ala | Pro | Val | Ala | Val | 130 | 135 | 140 | |
| Leu | Pro | Ala | Met | Asn | Gln | Gln | Met | Tyr | Arg | Ala | Ala | Ala | Thr | Gln | His | 145 | 150 | 155 | 160 |
| Asn | Leu | Glu | Val | Leu | Ala | Ser | Arg | Gly | Leu | Leu | Ile | Trp | Gly | Pro | Asp | 165 | 170 | 175 | |
| Ser | Gly | Ser | Gln | Ala | Cys | Gly | Asp | Ile | Gly | Pro | Gly | Arg | Met | Leu | Asp | 180 | 185 | 190 | |
| Pro | Leu | Thr | Ile | Val | Asp | Met | Ala | Val | Ala | His | Phe | Ser | Pro | Val | Asn | 195 | 200 | 205 | |
| Asp | Leu | Lys | His | Leu | Asn | Ile | Met | Ile | Thr | Ala | Gly | Pro | Thr | Arg | Glu | 210 | 215 | 220 | |
| Pro | Leu | Asp | Pro | Val | Arg | Tyr | Ile | Ser | Asn | His | Ser | Ser | Gly | Lys | Met | 225 | 230 | 235 | 240 |
| Gly | Phe | Ala | Ile | Ala | Ala | Ala | Ala | Ala | Arg | Arg | Gly | Ala | Asn | Val | Thr | 245 | 250 | 255 | |
| Leu | Val | Ser | Gly | Pro | Val | Ser | Leu | Pro | Thr | Pro | Pro | Phe | Val | Lys | Arg | 260 | 265 | 270 | |
| Val | Asp | Val | Met | Thr | Ala | Leu | Glu | Met | Glu | Ala | Ala | Val | Asn | Ala | Ser | 275 | 280 | 285 | |
| Val | Gln | Gln | Gln | Asn | Ile | Phe | Ile | Gly | Cys | Ala | Ala | Val | Ala | Asp | Tyr | 290 | 295 | 300 | |
| Arg | Ala | Ala | Thr | Val | Ala | Pro | Glu | Lys | Ile | Lys | Lys | Gln | Ala | Thr | Gln | 305 | 310 | 315 | 320 |
| Gly | Asp | Glu | Leu | Thr | Ile | Lys | Met | Val | Lys | Asn | Pro | Asp | Ile | Val | Ala | 325 | 330 | 335 | |
| Gly | Val | Ala | Ala | Leu | Lys | Asp | His | Arg | Pro | Tyr | Val | Val | Gly | Phe | Ala | 340 | 345 | 350 | |

Ala Glu Thr Asn Asn Val Glu Glu Tyr Ala Arg Gln Lys Arg Ile Arg
 355 360 365

Lys Asn Leu Asp Leu Ile Cys Ala Asn Asp Val Ser Gln Pro Thr Gln
 370 375 380

Gly Phe Asn Ser Asp Asn Asn Ala Leu His Leu Phe Trp Gln Asp Gly
 385 390 395 400

Asp Lys Val Leu Pro Leu Glu Arg Lys Glu Leu Leu Gly Gln Leu Leu
 405 410 415

Leu Asp Glu Ile Val Thr Arg Tyr Asp Glu Lys Asn Arg Arg
 420 425 430

<210> 291

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 291

gcggcgcccc atatgaaggc acgacaacaa aag

33

<210> 292

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 292

gcgcggatcc aacgggataa ccagaaaccg

30

<210> 293

<211> 21

<212> PRT

<213> Escherichia coli

<400> 293

Asn Asp Leu Val Ser Thr Ile Cys Leu Ala Thr Pro Ala Pro Val Ala
 1 5 10 15

Val Leu Pro Ala Met
 20

<210> 294
 <211> 21
 <212> PRT
 <213> Escherichia coli

<400> 294
 Trp Ala Asp Leu Val Ile Leu Ala Pro Ala Thr Ala Asp Leu Ile Ala
 1 5 10 15
 Arg Val Ala Ala Gly
 20

<210> 295
 <211> 13
 <212> PRT
 <213> Escherichia coli

<400> 295
 Leu Leu Gly Gln Leu Leu Leu Asp Glu Ile Val Thr Arg
 1 5 10

<210> 296
 <211> 972
 <212> DNA
 <213> Staphylococcus aureus

<400> 296
 atgaaagtca tagaagtgac acatcctata caatctaaac agtatattac agaggatggt 60
 gcaatggcat tcgatttttt cgatggcatg cataaaggctc atgacaaaagt ctttgatata 120
 ttaaacgaaa tagctgaggc acgcagttta aaaaaagcgg tgatgacatt tgatccgcat 180
 ccgtctgtcg tgttgaatcc taaaagaaaa cgaacaacgt atttaacgcc actttcagat 240
 aaaatcgaaa aaattagcca acatgatatt gattattgta tagtgggttaa tttttcatct 300
 aggtttgcta atgtgagcgt agaagatttt gttgaaaatt atataattaa aaataatgta 360
 aaagaagtca ttgctgggtt tgattttact tttggtaaatt ttggaaaagg taatatgact 420
 gtacttcaag aatatgatgc gtttaatacg acaattgtga gtaaacaaga aattgaaaat 480
 gaaaaaattt ctacaacttc tattcgtcaa gatttaatca atggtgagtt gcaaaaagcg 540
 aatgatgctt taggctatat atattctatt aaaggcactg tagtgcaagg tgaaaaaagg 600
 ggaagaacta ttggcttccc aacagctaac attcaaccta gtgatgatta tttgttacct 660
 cgtaaagggtg tttatgctgt tagtattgaa atcggcactg aaaataaatt atatcgaggg 720
 gtagctaaca tagtgtaaa gccaacattt catgaccta acaaagcaga agttgtcatc 780
 gaagtgaata tctttgactt tgaggataat atttatgggtg aacgagtgac cgtgaattgg 840
 catcatttct tacgtcctga gattaaattt gatgggtatcg acccattagt taaacaaatg 900
 aacgatgata aatcgcggtc taaatattta ttagcagttg attttgggtga tgaagtagct 960
 tataatatct ag 972

<210> 297
 <211> 323
 <212> PRT
 <213> Staphylococcus aureus

<400> 297
 Met Lys Val Ile Glu Val Thr His Pro Ile Gln Ser Lys Gln Tyr Ile
 1 5 10 15

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Thr | Glu | Asp | Val | Ala | Met | Ala | Phe | Gly | Phe | Phe | Asp | Gly | Met | His | Lys | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| Gly | His | Asp | Lys | Val | Phe | Asp | Ile | Leu | Asn | Glu | Ile | Ala | Glu | Ala | Arg | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| Ser | Leu | Lys | Lys | Ala | Val | Met | Thr | Phe | Asp | Pro | His | Pro | Ser | Val | Val | |
| | | 50 | | | | | 55 | | | | | 60 | | | | |
| Leu | Asn | Pro | Lys | Arg | Lys | Arg | Thr | Thr | Tyr | Leu | Thr | Pro | Leu | Ser | Asp | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Lys | Ile | Glu | Lys | Ile | Ser | Gln | His | Asp | Ile | Asp | Tyr | Cys | Ile | Val | Val | |
| | | | 85 | | | | | 90 | | | | | 95 | | | |
| Asn | Phe | Ser | Ser | Arg | Phe | Ala | Asn | Val | Ser | Val | Glu | Asp | Phe | Val | Glu | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Asn | Tyr | Ile | Ile | Lys | Asn | Asn | Val | Lys | Glu | Val | Ile | Ala | Gly | Phe | Asp | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Phe | Thr | Phe | Gly | Lys | Phe | Gly | Lys | Gly | Asn | Met | Thr | Val | Leu | Gln | Glu | |
| 130 | | | | | 135 | | | | | 140 | | | | | | |
| Tyr | Asp | Ala | Phe | Asn | Thr | Thr | Ile | Val | Ser | Lys | Gln | Glu | Ile | Glu | Asn | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| Glu | Lys | Ile | Ser | Thr | Thr | Ser | Ile | Arg | Gln | Asp | Leu | Ile | Asn | Gly | Glu | |
| | | | 165 | | | | | 170 | | | | | 175 | | | |
| Leu | Gln | Lys | Ala | Asn | Asp | Ala | Leu | Gly | Tyr | Ile | Tyr | Ser | Ile | Lys | Gly | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Thr | Val | Val | Gln | Gly | Glu | Lys | Arg | Gly | Arg | Thr | Ile | Gly | Phe | Pro | Thr | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Ala | Asn | Ile | Gln | Pro | Ser | Asp | Asp | Tyr | Leu | Leu | Pro | Arg | Lys | Gly | Val | |
| 210 | | | | | 215 | | | | | 220 | | | | | | |
| Tyr | Ala | Val | Ser | Ile | Glu | Ile | Gly | Thr | Glu | Asn | Lys | Leu | Tyr | Arg | Gly | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| Val | Ala | Asn | Ile | Gly | Val | Lys | Pro | Thr | Phe | His | Asp | Pro | Asn | Lys | Ala | |
| | | | 245 | | | | | 250 | | | | | 255 | | | |
| Glu | Val | Val | Ile | Glu | Val | Asn | Ile | Phe | Asp | Phe | Glu | Asp | Asn | Ile | Tyr | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| Gly | Glu | Arg | Val | Thr | Val | Asn | Trp | His | His | Phe | Leu | Arg | Pro | Glu | Ile | |
| | | 275 | | | | | 280 | | | | | 285 | | | | |
| Lys | Phe | Asp | Gly | Ile | Asp | Pro | Leu | Val | Lys | Gln | Met | Asn | Asp | Asp | Lys | |
| 290 | | | | | 295 | | | | | 300 | | | | | | |
| Ser | Arg | Ala | Lys | Tyr | Leu | Leu | Ala | Val | Asp | Phe | Gly | Asp | Glu | Val | Ala | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | |
| Tyr | Asn | Ile | | | | | | | | | | | | | | |

<210> 298
 <211> 972
 <212> DNA
 <213> Staphylococcus aureus

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<400> 298
atgaaagtca tagaagtgac acatcctata caatctaaac agtatattac agaggatggt 60
gcaatggcat tcgattttt cgatggcatg cataaaggct atgacaaagt ctttgatata 120
ttaaacgaaa tagctgaggc acgcagttta aaaaaagcgg tgatgacatt tgatccgcat 180
ccgtctgtcg tgttgaatcc taaaagaaaa cgaacaacgt atttaacgcc actttcagat 240
aaaatcgaaa aaattagcca acatgatatt gattattgta tagtgggttaa tttttcatct 300
aggtttgcta atgtgagcgt agaagatttt gttgaaaatt atataattaa aaataatgta 360
aaagaagtca ttgctgggtt tgattttact tttggtaaatt ttggaaaagg taatatgact 420
gtacttcaag aatatgatgc gtttaatacg acaattgtga gtaaacaaga aattgaaaaat 480
gaaaaaattt ctacaacttc tattcgtcaa gatttaatca atggtgagtt gcaaaaagcg 540
aatgatgctt taggctatat atattctatt aaaggcactg tagtgcaagg tgaaaaaagg 600
ggaagaacta ttggcttccc aacagctaac attcaaccta gtgatgatta tttgttacct 660
cgtaaagggtg tttatgctgt tagtattgaa atcggcactg aaaaataaatt atacgagggg 720
gtagctaaca taggtgtaaa gccaacattt catgatccta acaaagcaga agttgtcatc 780
gaagtgaata tctttgactt tgaggataat atttatgggtg aacgagtgac cgtgaattgg 840
catcatttct tacgtcctga gattaaattt gatggtatcg acccattagt taaacaaatg 900
aacgatgata aatcgcggtgc taaatattta ttagcagttg attttgggtga tgaagtagct 960
tataatatct ag 972
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<210> 299
 <211> 323
 <212> PRT
 <213> Staphylococcus aureus

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<400> 299
Met Lys Val Ile Glu Val Thr His Pro Ile Gln Ser Lys Gln Tyr Ile
  1             5             10             15

Thr Glu Asp Val Ala Met Ala Phe Gly Phe Phe Asp Gly Met His Lys
          20             25             30

Gly His Asp Lys Val Phe Asp Ile Leu Asn Glu Ile Ala Glu Ala Arg
          35             40             45

Ser Leu Lys Lys Ala Val Met Thr Phe Asp Pro His Pro Ser Val Val
          50             55             60

Leu Asn Pro Lys Arg Lys Arg Thr Thr Tyr Leu Thr Pro Leu Ser Asp
          65             70             75             80

Lys Ile Glu Lys Ile Ser Gln His Asp Ile Asp Tyr Cys Ile Val Val
          85             90             95

Asn Phe Ser Ser Arg Phe Ala Asn Val Ser Val Glu Asp Phe Val Glu
          100             105             110

Asn Tyr Ile Ile Lys Asn Asn Val Lys Glu Val Ile Ala Gly Phe Asp
          115             120             125
```

Phe Thr Phe Gly Lys Phe Gly Lys Gly Asn Met Thr Val Leu Gln Glu
 130 135 140
 Tyr Asp Ala Phe Asn Thr Thr Ile Val Ser Lys Gln Glu Ile Glu Asn
 145 150 155 160
 Glu Lys Ile Ser Thr Thr Ser Ile Arg Gln Asp Leu Ile Asn Gly Glu
 165 170 175
 Leu Gln Lys Ala Asn Asp Ala Leu Gly Tyr Ile Tyr Ser Ile Lys Gly
 180 185 190
 Thr Val Val Gln Gly Glu Lys Arg Gly Arg Thr Ile Gly Phe Pro Thr
 195 200 205
 Ala Asn Ile Gln Pro Ser Asp Asp Tyr Leu Leu Pro Arg Lys Gly Val
 210 215 220
 Tyr Ala Val Ser Ile Glu Ile Gly Thr Glu Asn Lys Leu Tyr Arg Gly
 225 230 235 240
 Val Ala Asn Ile Gly Val Lys Pro Thr Phe His Asp Pro Asn Lys Ala
 245 250 255
 Glu Val Val Ile Glu Val Asn Ile Phe Asp Phe Glu Asp Asn Ile Tyr
 260 265 270
 Gly Glu Arg Val Thr Val Asn Trp His His Phe Leu Arg Pro Glu Ile
 275 280 285
 Lys Phe Asp Gly Ile Asp Pro Leu Val Lys Gln Met Asn Asp Asp Lys
 290 295 300
 Ser Arg Ala Lys Tyr Leu Leu Ala Val Asp Phe Gly Asp Glu Val Ala
 305 310 315 320
 Tyr Asn Ile

<210> 300

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 300

gcggcgcccc atatgaaagt catagaagtg acac

34

<210> 301

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 301

gcgcggatcc tttttcgatt ttatctgaaa gtg

33

<210> 302

<211> 13

<212> PRT

<213> Staphylococcus aureus

<400> 302

Gln His Asp Ile Asp Tyr Cys Ile Val Val Asn Phe Ser

1

5

10

<210> 303

<211> 9

<212> PRT

<213> Staphylococcus aureus

<400> 303

Pro His Pro Ser Val Val Leu Asn Pro

1

5

<210> 304

<211> 8

<212> PRT

<213> Staphylococcus aureus

<400> 304

Ala Lys Tyr Leu Leu Ala Val Asp

1

5

<210> 305

<211> 480

<212> DNA

<213> Pseudomonas aeruginosa

<400> 305

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atgaaccgag tgctgtaccc aggcaccttc gatcccatca ccaaggggtca cggcgatctg 60
atcgaacgtg cttcacggct tttcgaccat gtgatcatcg cggtcgccgc cagccccaag 120
aagaaccccc tgttcagcct ggaacagcgg gttgcgctgg ccaggagggt caccaagcac 180
ctgccgaacg tcgaggtggg gggcttctcc accctgctgg cgcacttcgt caaggagcag 240
aaggcgaatg tcttcctccg cggcctgcgc gcggtttccg acttcgagta cgagttccag 300
ctggccaaca tgaaccgcca gctcgcccc gacgtggaaa gcatgttcct caccocgtcg 360
gagaagtatt ccttcatttc ctgcacgctg gtccgggaaa tcgccgctct cggcggggat 420
atcagcaagt tcgtgcatcc ggccgtggca gacgccctgg cggaacgttt caagcgctga 480

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<210> 306

<211> 159

<212> PRT

<213> Pseudomonas aeruginosa

<400> 306

Met Asn Arg Val Leu Tyr Pro Gly Thr Phe Asp Pro Ile Thr Lys Gly
 1 5 10 15

His Gly Asp Leu Ile Glu Arg Ala Ser Arg Leu Phe Asp His Val Ile
 20 25 30

Ile Ala Val Ala Ala Ser Pro Lys Lys Asn Pro Leu Phe Ser Leu Glu
 35 40 45

Gln Arg Val Ala Leu Ala Gln Glu Val Thr Lys His Leu Pro Asn Val
 50 55 60

Glu Val Val Gly Phe Ser Thr Leu Leu Ala His Phe Val Lys Glu Gln
 65 70 75 80

Lys Ala Asn Val Phe Leu Arg Gly Leu Arg Ala Val Ser Asp Phe Glu
 85 90 95

Tyr Glu Phe Gln Leu Ala Asn Met Asn Arg Gln Leu Ala Pro Asp Val
 100 105 110

Glu Ser Met Phe Leu Thr Pro Ser Glu Lys Tyr Ser Phe Ile Ser Ser
 115 120 125

Thr Leu Val Arg Glu Ile Ala Ala Leu Gly Gly Asp Ile Ser Lys Phe
 130 135 140

Val His Pro Ala Val Ala Asp Ala Leu Ala Glu Arg Phe Lys Arg
 145 150 155

<210> 307

<211> 480

<212> DNA

<213> *Pseudomonas aeruginosa*

<400> 307

atgaaccgag tgctgtaccc aggcaccttc gatcccatca ccaaggggtca cggcgatctg 60
 atcgaacgtg cttcacggct ttctgacccat gtgatcatcg cggtcgccgc cagccccaag 120
 aagaaccccc tggtcagcct ggaacagcgg gtggcgctgg ccaggaggt caccaagcac 180
 ctgccgaacg tcgaggtggg gggcttctcc accctgctgg cgcacttcgt caaggagcag 240
 aaggcgaatg tcttcctccg cggcctgcgc gcggtttccg acttcgagta cgagttccag 300
 ctggccaaca tgaaccgcca gctcgccccc gacgtggaaa gcatgttcct caccctgtcg 360
 gagaagtatt cttcatttc ctgcacgctg gtccgggaaa tcgccgctct cggcggggat 420
 atcagcaagt tcgtgcatcc ggccgtggca gacgccctgg cggaacgttt caagcgctga 480

<210> 308

<211> 159

<212> PRT

<213> *Pseudomonas aeruginosa*

<400> 308

Met Asn Arg Val Leu Tyr Pro Gly Thr Phe Asp Pro Ile Thr Lys Gly
 1 5 10 15

His Gly Asp Leu Ile Glu Arg Ala Ser Arg Leu Phe Asp His Val Ile
 20 25 30
 Ile Ala Val Ala Ala Ser Pro Lys Lys Asn Pro Leu Phe Ser Leu Glu
 35 40 45
 Gln Arg Val Ala Leu Ala Gln Glu Val Thr Lys His Leu Pro Asn Val
 50 55 60
 Glu Val Val Gly Phe Ser Thr Leu Leu Ala His Phe Val Lys Glu Gln
 65 70 75 80
 Lys Ala Asn Val Phe Leu Arg Gly Leu Arg Ala Val Ser Asp Phe Glu
 85 90 95
 Tyr Glu Phe Gln Leu Ala Asn Met Asn Arg Gln Leu Ala Pro Asp Val
 100 105 110
 Glu Ser Met Phe Leu Thr Pro Ser Glu Lys Tyr Ser Phe Ile Ser Ser
 115 120 125
 Thr Leu Val Arg Glu Ile Ala Ala Leu Gly Gly Asp Ile Ser Lys Phe
 130 135 140
 Val His Pro Ala Val Ala Asp Ala Leu Ala Glu Arg Phe Lys Arg
 145 150 155

<210> 309

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 309

gcggcgccc atatgaaccg agtgctgtac c

31

<210> 310

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 310

gcgcggatcc gcgcttgaaa cgttccgc

28

<210> 311

<211> 17

<212> PRT

<213> Pseudomonas aeruginosa

<400> 311

Glu Arg Ala Ser Arg Leu Phe Asp His Val Ile Ile Ala Val Ala Ala
 1 5 10 15

Ser

<210> 312

<211> 14

<212> PRT

<213> Pseudomonas aeruginosa

<400> 312

Ser Lys Phe Val His Pro Ala Val Ala Asp Ala Leu Ala Glu
 1 5 10

<210> 313

<211> 39

<212> PRT

<213> Pseudomonas aeruginosa

<400> 313

Lys Asn Pro Leu Phe Ser Leu Glu Gln Arg Val Ala Leu Ala Gln Glu
 1 5 10 15

Val Thr Lys His Leu Pro Asn Val Glu Val Val Gly Phe Ser Thr Leu
 20 25 30

Leu Ala His Phe Val Lys Glu
 35

<210> 314

<211> 1083

<212> DNA

<213> Pseudomonas aeruginosa

<400> 314

atgaaagctt ctctgctgaa aaagctggat gtcctcagcg atcgctacga agaactgacg 60
 gcgctgctcg gcgacgccga ggtgatcagt gaccagaccc gcttccgcgc ctattcccgc 120
 gagtacgccg aggtcgaacc ggtgatcctg gcgttccgcg actaccgcaa ggtgcaggcc 180
 gacctcgagg gcgcccaggc gttgctcaag gacagcgacc cggagttgcg cgacctcgcc 240
 gaggaggagg tcgccgaagc gcgcggccgc ctccgccccc tcggcgacag cctgcagcgc 300
 atgctgctgc cgaaggatcc caacgacagc cgcaacgtgt tcctggagat ccgtgccggc 360
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tga 1083

<210> 315

<211> 360

<212> PRT

<213> *Pseudomonas aeruginosa*

<400> 315

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20 25 30

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35 40 45

Ile Leu Ala Phe Arg Asp Tyr Arg Lys Val Gln Ala Asp Leu Glu Gly
50 55 60

Ala Gln Ala Leu Leu Lys Asp Ser Asp Pro Glu Leu Arg Asp Leu Ala
65 70 75 80

Glu Glu Glu Val Ala Glu Ala Arg Gly Arg Leu Ala Ala Leu Gly Asp
85 90 95

Ser Leu Gln Arg Met Leu Leu Pro Lys Asp Pro Asn Asp Ser Arg Asn
100 105 110

Val Phe Leu Glu Ile Arg Ala Gly Thr Gly Gly Asp Glu Ala Ala Ile
115 120 125

Phe Ser Gly Asp Leu Phe Arg Met Tyr Ser Arg Tyr Ala Glu Arg Gln
130 135 140

Gly Trp Arg Ile Glu Thr Leu Ser Glu Asn Glu Gly Glu His Gly Gly
145 150 155 160

Tyr Lys Glu Val Ile Ala Arg Val Glu Gly Asp Asn Val Tyr Ala Lys
165 170 175

Leu Lys Phe Glu Ser Gly Ala His Arg Val Gln Arg Val Pro Glu Thr
180 185 190

Glu Ser Gln Gly Arg Ile His Thr Ser Ala Cys Thr Val Ala Val Leu
195 200 205

Pro Glu Pro Asp Glu Gln Ala Ala Ile Glu Ile Asn Pro Ala Asp Leu
210 215 220

Arg Val Asp Thr Tyr Arg Ser Ser Gly Ala Gly Gly Gln His Val Asn
225 230 235 240

Lys Thr Asp Ser Ala Val Arg Ile Thr His Ile Pro Ser Gly Ile Val
245 250 255

Val Glu Cys Gln Glu Glu Arg Ser Gln His Lys Asn Arg Ala Lys Ala
260 265 270

Met Ala Trp Leu Ala Ala Lys Leu Asn Asp Gln Gln Gln Ala Ala Ala
275 280 285

Gln Gln Ala Ile Ala Ser Thr Arg Lys Leu Leu Val Gly Ser Gly Asp
290 295 300

Arg Ser Glu Arg Ile Arg Thr Tyr Asn Phe Pro Gln Gly Arg Val Thr
305 310 315 320

Asp His Arg Ile Asn Leu Thr Leu Tyr Ser Leu Gly Glu Val Met Glu
325 330 335

Gly Ala Val Glu Gln Val Ile Glu Pro Leu Leu Gln Glu Tyr Gln Ala
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Asp Gln Leu Ala Ala Leu Gly Asp
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<210> 316

<211> 1083

<212> DNA

<213> *Pseudomonas aeruginosa*

<400> 316

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tga 1083
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<210> 317

<211> 360

<212> PRT

<213> *Pseudomonas aeruginosa*

<400> 317

Met Lys Ala Ser Leu Leu Lys Lys Leu Asp Val Leu Ser Asp Arg Tyr
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| Glu | Glu | Leu | Thr | Ala | Leu | Leu | Gly | Asp | Ala | Glu | Val | Ile | Ser | Asp | Gln | | |
| | | | 20 | | | | | 25 | | | | | 30 | | | | |
| Thr | Arg | Phe | Arg | Ala | Tyr | Ser | Arg | Glu | Tyr | Ala | Glu | Val | Glu | Pro | Leu | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | | |
| Ile | Leu | Glu | Phe | Arg | Asp | Tyr | Arg | Lys | Val | Gln | Ala | Asp | Leu | Glu | Gly | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | |
| Ala | Gln | Ala | Leu | Leu | Lys | Asp | Ser | Asp | Pro | Glu | Leu | Arg | Asp | Leu | Ala | | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | | |
| Glu | Glu | Glu | Val | Ala | Glu | Ala | Arg | Gly | Arg | Leu | Ala | Ala | Leu | Gly | Asp | | |
| | | | | 85 | | | | | 90 | | | | | 95 | | | |
| Ser | Leu | Gln | Arg | Met | Leu | Leu | Pro | Lys | Asp | Pro | Asn | Asp | Ser | Arg | Asn | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | |
| Val | Phe | Leu | Glu | Ile | Arg | Ala | Gly | Thr | Gly | Gly | Asp | Glu | Ala | Ala | Ile | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | |
| Phe | Ser | Gly | Asp | Leu | Phe | Arg | Met | Tyr | Ser | Arg | Tyr | Ala | Glu | Arg | Gln | | |
| | 130 | | | | | 135 | | | | | 140 | | | | | | |
| Gly | Trp | Arg | Ile | Glu | Thr | Leu | Ser | Glu | Asn | Glu | Gly | Glu | His | Gly | Gly | | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | | |
| Tyr | Lys | Glu | Val | Ile | Ala | Arg | Val | Glu | Gly | Asp | Asn | Val | Tyr | Ala | Lys | | |
| | | | | 165 | | | | | 170 | | | | | 175 | | | |
| Leu | Lys | Phe | Glu | Ser | Gly | Ala | His | Arg | Val | Gln | Arg | Val | Pro | Glu | Thr | | |
| | | | 180 | | | | | 185 | | | | | 190 | | | | |
| Glu | Ser | Gln | Gly | Arg | Ile | His | Thr | Ser | Ala | Cys | Thr | Val | Ala | Val | Leu | | |
| | | 195 | | | | | 200 | | | | | 205 | | | | | |
| Pro | Glu | Pro | Asp | Glu | Gln | Ala | Ala | Ile | Glu | Ile | Asn | Pro | Ala | Asp | Leu | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | |
| Arg | Val | Asp | Thr | Tyr | Arg | Ser | Ser | Gly | Ala | Gly | Gly | Gln | His | Val | Asn | | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | | |
| Lys | Thr | Asp | Ser | Ala | Val | Arg | Ile | Thr | His | Ile | Pro | Ser | Gly | Ile | Val | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | |
| Val | Glu | Cys | Gln | Glu | Glu | Arg | Ser | Gln | His | Lys | Asn | Arg | Ala | Lys | Ala | | |
| | | | 260 | | | | | 265 | | | | | 270 | | | | |
| Met | Ala | Trp | Leu | Ala | Ala | Lys | Leu | Asn | Asp | Gln | Gln | Gln | Ala | Ala | Ala | | |
| | | 275 | | | | | 280 | | | | | 285 | | | | | |
| Gln | Gln | Ala | Ile | Ala | Ser | Thr | Arg | Lys | Leu | Leu | Val | Gly | Ser | Gly | Val | | |
| | 290 | | | | | 295 | | | | | 300 | | | | | | |
| Arg | Ser | Glu | Arg | Ile | Arg | Thr | Tyr | Asn | Phe | Pro | Gln | Gly | Arg | Val | Thr | | |
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<211> 36
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<213> Artificial Sequence
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<220>
<223> Description of Artificial Sequence: Synthetic
      primer
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<400> 318
gcggcgcccc atatgaaagc ttctctgctg aaaaag 36

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<210> 319
<211> 26
<212> DNA
<213> Artificial Sequence
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<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 319
gcgcagatct gtcgccagg gccgcc 26

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<210> 320
<211> 11
<212> PRT
<213> Pseudomonas aeruginosa
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<400> 320
Thr Ser Ala Cys Thr Val Ala Val Leu Pro Glu
  1                   5                   10
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<210> 321
<211> 12
<212> PRT
<213> Pseudomonas aeruginosa
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<400> 321
Tyr Ala Glu Val Glu Pro Val Ile Leu Ala Phe Arg
1 5 10

<210> 322
 <211> 17
 <212> PRT
 <213> *Pseudomonas aeruginosa*

<400> 322
 Ser Ala Val Arg Ile Thr His Ile Pro Ser Gly Ile Val Val Glu Cys
 1 5 10 15

Gln

<210> 323
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 peptide motif

<220>
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 <222> (3)
 <223> Ile or Met

<400> 323
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<210> 324
 <211> 7
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 peptide motif

<220>
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 <222> (2)
 <223> Gly or Ser

<220>
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 <222> (5)
 <223> Variable amino acid

<400> 324
 Gly Xaa Ile Ala Xaa Tyr Lys
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<210> 325
 <211> 6
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 6xHis tag

<400> 325
 His His His His His His
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 <213> Staphylococcus aureus

<400> 326
 Met Glu Cys Ile
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<210> 327
 <211> 6
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<400> 327
 Met Glu Cys Ile Lys Met
 1 5

<210> 328
 <211> 8
 <212> PRT
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<400> 328
 Met Glu Cys Ile Lys Met Leu Asn
 1 5

<210> 329
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<400> 329
 Met Glu Cys Ile Lys Met Leu Asn Tyr Thr
 1 5 10

<210> 330
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<400> 330

Met Glu Cys Ile Lys Met Leu Asn Tyr
1 5

<210> 331

<211> 15

<212> PRT

<213> Staphylococcus aureus

<400> 331

Met Glu Cys Ile Lys Met Leu Asn Tyr Thr Gly Leu Glu Asn Lys
1 5 10 15

<210> 332

<211> 15

<212> PRT

<213> Staphylococcus aureus

<400> 332

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1 5 10 15

<210> 333

<211> 13

<212> PRT

<213> Staphylococcus aureus

<400> 333

Lys Phe Ile Glu Arg Phe Arg Ala His Leu Pro Ser Tyr
1 5 10

<210> 334

<211> 11

<212> PRT

<213> Staphylococcus aureus

<400> 334

Ile Glu Arg Phe Arg Ala His Leu Pro Ser Tyr
1 5 10

<210> 335

<211> 9

<212> PRT

<213> Staphylococcus aureus

<400> 335

Arg Phe Arg Ala His Leu Pro Ser Tyr
1 5

<210> 336
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 Phe Arg Ala His Leu Pro Ser Tyr
 1 5

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<400> 337
 His Leu Pro Ser Tyr
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<210> 341
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 Met Ser Lys Glu Phe Tyr Ile Met Thr His
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<210> 345
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<210> 346
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 Met Gly Lys Tyr
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<210> 347
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<400> 347

Met Gly Lys Tyr Phe Gly
1 5

<210> 348

<211> 8

<212> PRT

<213> Streptococcus pneumoniae

<400> 348

Met Gly Lys Tyr Phe Gly Thr Asp
1 5

<210> 349

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<212> PRT

<213> Streptococcus pneumoniae

<400> 349

Met Gly Lys Tyr Phe Gly Thr Asp Gly Val
1 5 10

<210> 350

<211> 10

<212> PRT

<213> Streptococcus pneumoniae

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1 5 10

<210> 351

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<212> PRT

<213> Streptococcus pneumoniae

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Val Arg Ala Glu Ile Gly Ile Asp
1 5

<210> 352

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<213> Streptococcus pneumoniae

<400> 352

Ala Glu Ile Gly Ile Asp
1 5

<210> 353
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<400> 353
 Ile Gly Ile Asp
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<210> 354
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<400> 354
 Met Lys Val Ile Asp Gln Phe Lys Asn Lys
 1 5 10

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 <212> PRT
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<400> 355
 Met Lys Val Ile Asp Gln Phe
 1 5

<210> 356
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 1 5

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Val Lys Met Ala Asn Pro

1 5

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Val Lys Met Ala Asn Pro Lys Tyr

1 5

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<400> 366

Val Lys Met Ala Asn Pro Lys Tyr Lys Arg

1 5 10

<210> 367

<211> 13

<212> PRT

<213> Streptococcus pneumoniae

<400> 367

Val Lys Met Ala Asn Pro Lys Tyr Lys Arg Ile Leu Ile

1 5 10

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<400> 368

Thr Val Ser Asn Asn Ile Glu Glu Lys Glu

1 5 10

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<212> PRT

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<400> 369

Ser Asn Asn Ile Glu Glu Lys Glu

1 5

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Asn Ile Glu Glu Lys Glu
1 5

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Glu Glu Lys Glu
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<211> 13
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